

**EPA Superfund
Record of Decision:**

**WASATCH CHEMICAL CO. (LOT 6)
EPA ID: UTD000716399
OU 01
SALT LAKE CITY, UT
03/29/1991**

EXCAVATION OF ALL SOILS CONTAINING INDICATOR CHEMICALS ABOVE ACTION LEVELS, AND SLUDGES FROM THE YARD AND PROCESS DRAIN SYSTEMS AND THE SEPTIC SYSTEM, AND CONSOLIDATION OF THESE MATERIALS AND DIOXIN REMOVAL WASTES (APPROXIMATELY 3,587 CUBIC YARDS OF SOILS AND SLUDGES AND 650 GALLONS OF LIQUID WASTE) IN THE FORMER EVAPORATION POND;

TREATMENT OF STAGED SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES BY THERMAL DESTRUCTION OF CONTAMINANTS THROUGH IN-SITU VITRIFICATION (ISV); EXCAVATION AND LAND FARMING OF APPROXIMATELY 1,111 CUBIC YARDS OF HYDROCARBON-CONTAMINATED SOILS;

EXTRACTION OF ON-SITE CONTAMINATED GROUND WATER UNTIL MCLS AND PROPOSED MCLS ARE MET, AND TREATMENT, TO THE EXTENT NECESSARY, OF EXTRACTED GROUND WATER BY AIR STRIPPING TO MEET POTW OR UPDES STANDARDS;

SURFACE SEALING BY ASPHALT PAVING;

DISPOSAL OF ANY RESIDUALS REMAINING FROM THE TREATMENT OF GROUND WATER AT AN OFF-SITE HAZARDOUS MATERIAL DISPOSAL FACILITY;

AS AN EXTRA PRECAUTIONARY MEASURE, IMPLEMENTATION OF INSTITUTIONAL CONTROLS SUCH AS DEED RESTRICTIONS, DENIAL OF WELL PERMITS, OR ACQUISITION OF WATER RIGHTS, AS PRACTICABLE AND TO THE EXTENT ALLOWABLE BY LAW.

BOTH SOILS AND GROUND WATER ARE TO BE REMEDIATED AS ONE OPERABLE UNIT FOR THE SITE. THE GROUND WATER PORTION OF THE REMEDY FOR THE SITE, HOWEVER, IS SUBJECT TO POSSIBLE FUTURE MODIFICATION BECAUSE CERTAIN PORTIONS OF GROUND WATER REMAIN UNCHARACTERIZED. THE GROUND WATER PORTION OF THE REMEDY IS FINAL FOR CONTAMINATED GROUND WATER UNDERLYING THE WASATCH CHEMICAL PROPERTY AND FOR THAT PORTION OF THE STEELCO PROPERTY EXTENDING 80 FEET NORTH OF THE WASATCH CHEMICAL PROPERTY'S NORTHERN BOUNDARY (HEREINAFTER REFERRED TO AS THE SOUTHERN PORTION OF THE STEELCO PROPERTY). HOWEVER, CONTAMINATED GROUND WATER UNDERLYING THAT PORTION OF THE STEELCO PROPERTY WHICH LIES TO THE NORTH OF THE 80 FOOT DEMARCATION (HEREINAFTER REFERRED TO AS THE NORTHERN PORTION OF THE STEELCO PROPERTY) HAS NOT BEEN FULLY CHARACTERIZED. NO REMEDY WILL BE FINALIZED FOR THE CONTAMINATED GROUND WATER UNDERLYING THE NORTHERN PORTION OF THE STEELCO PROPERTY UNTIL IT HAS BEEN ADEQUATELY CHARACTERIZED. FURTHER INVESTIGATIONS AND SUBSEQUENT REMEDIAL DECISIONS REGARDING GROUND WATER BENEATH THE NORTHERN PORTION OF THE STEELCO PROPERTY MAY NECESSITATE FUTURE MODIFICATION OF THE GROUND WATER REMEDY FOR THE WASATCH CHEMICAL PROPERTY AND THE SOUTHERN PORTION OF THE STEELCO PROPERTY, OR OTHER REMEDIAL ACTION.

STATUTORY DETERMINATIONS

THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, COMPLIES WITH FEDERAL AND STATE REQUIREMENTS THAT ARE LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE TO THE REMEDIAL ACTION (OR JUSTIFIES A WAIVER OF ANY FEDERAL AND STATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS THAT WILL NOT BE MET), AND IS COST-EFFECTIVE. THIS REMEDY UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. IT SATISFIES THE STATUTORY PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT TO REDUCE TOXICITY, MOBILITY, OR VOLUME.

BECAUSE THIS REMEDY WILL REDUCE LEVELS OF HAZARDOUS SUBSTANCES IN SOILS TO HEALTH-BASED ACTION LEVELS SUITABLE FOR INDUSTRIAL USE, BUT NOT FOR UNLIMITED USE, AND BECAUSE THE GROUND WATER REMEDY MAY LEAVE RESIDUAL HAZARDOUS SUBSTANCES ABOVE ACTION LEVELS OR PROPOSED MCLS), RULING OUT UNLIMITED USE OF ON-SITE GROUND WATER, A REVIEW OF SOILS AND GROUND WATER WILL BE CONDUCTED NO LESS OFTEN THAN EACH FIVE YEARS AFTER INITIATION OF THE REMEDIAL ACTION FOR EACH MEDIUM TO ENSURE THAT THE REMEDY CONTINUES TO PROVIDE ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. HOWEVER, ONCE IT IS DETERMINED THAT ISV TREATMENT HAS RESULTED IN ATTAINING HEALTH-BASED ACTION LEVELS FOR UNLIMITED USE, THERE WILL BE NO NEED FOR CONTINUED MONITORING OF THE NON-HAZARDOUS VITRIFIED MATERIAL.

JAMES J. SCHERER
REGIONAL ADMINISTRATOR
EPA REGION VIII

DATE: 03/29/91

KENNETH L. ALKEMA, DIRECTOR
UTAH DIVISION OF ENVIRONMENTAL HEALTH
UTAH DEPARTMENT OF HEALTH

DATE: 03/28/91

DECISION SUMMARY FOR THE RECORD OF DECISION

#SNLD

1. SITE NAME, LOCATION, AND DESCRIPTION

THE WASATCH CHEMICAL SITE IS LOCATED AT 1987 SOUTH 700 WEST STREET IN SALT LAKE CITY, UTAH. THE SITE IS APPROXIMATELY ONE-HALF MILE EAST OF THE JORDAN RIVER, 1,000 FEET WEST OF INTERSTATE 15, AND ADJACENT TO THE 2100 SOUTH FREEWAY.

THE SITE BOUNDARIES CIRCUMSCRIBE THOSE AREAS WHERE CONTAMINANTS FROM SITE ACTIVITIES MAY HAVE BEEN PLACED OR MAY HAVE MIGRATED. ON THIS BASIS, THE CURRENT SITE BOUNDARIES ARE AS FOLLOWS: TO THE EAST, THE TRACKS OF THE DENVER AND RIO GRANDE WESTERN RAILROAD (DRGWR); TO THE SOUTH, 2100 SOUTH STREET; TO THE WEST, 700 WEST STREET; AND TO THE NORTH, A LINE OF DEMARCATION EXTENDING ACROSS THE STEELCO PROPERTY AT A DISTANCE OF 80 FEET FROM THE NORTHERN EDGE OF LOT 6. THESE BOUNDARIES MAY BE ADJUSTED IF CONTAMINANTS FROM SITE ACTIVITIES ARE FOUND TO HAVE BEEN PLACED OR TO HAVE MIGRATED TO AREAS OUTSIDE THESE BOUNDARIES. AS INDICATED IN FIGURE 1.1, THE SITE CONTAINS THE FORMER WASATCH CHEMICAL PROPERTY (APPROXIMATELY 18 ACRES) AND PORTIONS OF ADJACENT PROPERTIES.

THE FORMER WASATCH CHEMICAL PROPERTY, MUCH OF WHICH IS CURRENTLY OCCUPIED BY GREAT WESTERN CHEMICAL COMPANY (GWCC), CONSISTS OF ALL OR PORTIONS OF LOTS 2 THROUGH 6. LOT 6, WHICH IS AN UNPAVED 3.7-ACRE AREA LOCATED AT THE NORTH END OF THE SITE, WAS PLACED ON THE NATIONAL PRIORITIES LIST (NPL) ON FEBRUARY 11, 1991(56 FEDERAL REGISTER 3903). A RAILROAD RIGHT-OF-WAY BELONGING TO DRGWR RUNS ALONG THE EASTERN BOUNDARY OF THE SITE. AN AREA DIRECTLY NORTH OF LOT 6 IS OCCUPIED BY A STEEL FABRICATION FACILITY OWNED BY ALTA INDUSTRIES, INC. AND KNOWN AS THE STEELCO PROPERTY. BECAUSE THE SOURCE OF SOME OF THE GROUND WATER CONTAMINATION FOUND ON STEELCO PROPERTY IS UNCLEAR, THE GROUND WATER REMEDIAL ACTIONS DESCRIBED IN THIS ROD ARE FINAL ONLY UP TO 80 FEET NORTH OF THE NORTHERN BOUNDARY OF LOT 6 (THE SOUTHERN PORTION OF THE STEELCO PROPERTY). THIS ROD ADDRESSES CONTAMINATED MEDIA ON ALL AFFECTED AREAS OF THE SITE, NOT JUST THOSE FOUND ON LOT 6.

THE SITE LIES WITHIN AN INDUSTRIALIZED CORRIDOR ADJACENT TO INTERSTATE 15. THE LOCAL TOPOGRAPHY IS GENERALLY FLAT AND LOW-LYING. THE ELEVATED ROAD BED OF THE 2100 SOUTH FREEWAY SEPARATES THE SITE TOPOGRAPHICALLY FROM VACANT, SWAMPY LAND TO THE SOUTH. THE NEAREST RESIDENTIAL AREA IS LOCATED APPROXIMATELY A QUARTER-MILE NORTHWEST OF THE SITE. THE POPULATION WITHIN A ONE-MILE RADIUS IS APPROXIMATELY 5,000. THE SITE DOES NOT LIE WITHIN A FLOOD ZONE.

SURFACE WATER RUNOFF IN THE AREA IS DRAINED BY A NETWORK OF DITCHES. ONE OF THESE, THE 700 WEST DITCH, IS AN UNLINED DITCH LOCATED ADJACENT TO THE WEST BOUNDARY OF THE SITE AND RECEIVES SURFACE DRAINAGE FROM THE SITE. THE DITCH WATER IS ULTIMATELY DISCHARGED TO THE GREAT SALT LAKE.

THE SITE LIES NEAR THE CENTER OF THE JORDAN RIVER VALLEY, WHICH IS UNDERLAIN BY A THICK AQUIFER THAT SUPPLIES MUCH OF THE REGION'S WATER. THIS AQUIFER IS CONSIDERED A SINGLE AQUIFER IN THE SALT LAKE VALLEY. IT CONSISTS OF DEEP AND SHALLOW PORTIONS SEPARATED BY & DISCONTINUOUS CONFINING LAYER. GROUND WATER IN THE SHALLOW PORTION OF THE AQUIFER AT THE SITE IS LOCATED APPROXIMATELY 2 FEET BELOW THE LAND SURFACE, FLOWS TOWARDS THE NORTHWEST, AND IS CURRENTLY UNCLASSIFIED. WATER QUALITY IN THE SHALLOW PORTION OF THE AQUIFER IS HIGHLY VARIABLE, AND SOME LOCALIZED AREAS ARE SUITABLE FOR USE AS DRINKING WATER. WHILE THE WATER CONTAINED IN THE SHALLOW PORTION OF THE AQUIFER AT THE SITE IS NOT CURRENTLY BEING USED AS A SOURCE OF DRINKING WATER, ITS POTENTIAL FUTURE USE AS SUCH CANNOT BE DISCOUNTED. IN ADDITION, THERE IS A POTENTIAL FOR HYDRAULIC CONNECTION BETWEEN THE DEEP AND SHALLOW PORTIONS OF THE AQUIFER, ESPECIALLY IN LIGHT OF THE POTENTIAL FOR HEAVY PUMPING OF THE DEEPER PORTION OF THE AQUIFER IN CONJUNCTION WITH INCREASING WATER DEMANDS OF THE REGION. DEGRADATION OF DRINKING WATER SUPPLIES IN THE DEEP PORTION OF THE AQUIFER COULD RESULT IF CONTAMINANTS MIGRATE DOWN FROM THE SHALLOW PORTION OF THE AQUIFER.

FIGURE 1.2 SHOWS THE LOCATIONS OF BUILDINGS, WASTE DISPOSAL FEATURES, AND OTHER PERTINENT FEATURES DESCRIBED ELSEWHERE IN THIS ROD.

LOT 6 CONTAINS A FORMER CONCRETE INDUSTRIAL WASTEWATER EVAPORATION POND (THE FORMER EVAPORATION POND) THAT HAS BEEN BACKFILLED WITH EARTHEN MATERIALS AND COVERED WITH A CONCRETE CAP. A BURIED PROCESS DRAIN LINE, ORIGINATING IN BUILDINGS G AND F, FORMERLY DISCHARGED WASTEWATER FROM THE CHEMICAL PROCESSING AREAS TO THIS POND. AN ABANDONED SEWAGE SEPTIC TANK AND LEACH LINES ARE ALSO LOCATED IN LOT 6. THIS TANK MAY HAVE RECEIVED PROCESS WASTE MATERIAL AT ONE TIME.

AN UNDERGROUND FUEL TANK IS LOCATED IN THE NORTH END OF THE WASATCH CHEMICAL PROPERTY. A NUMBER OF ABOVE-GROUND LIQUID CHEMICAL STORAGE TANKS ARE ALSO LOCATED NEAR THE CHLORINE BUILDING (SEE FIGURE 1.2). THESE TANKS ARE CURRENTLY USED IN SITE OPERATIONS. A VARIETY OF CHEMICAL PRODUCTS STORED IN DRUMS ARE ALSO USED IN SITE OPERATIONS. A SYSTEM OF OVERHEAD PIPES LOCATED ALONG THE RAILROAD SPUR WITHIN THE EASTERN BOUNDARY OF THE SITE ARE USED FOR UNLOADING LIQUID CHEMICALS FROM RAIL TANK CARS.

AN ENCLOSED STORAGE CONTAINER LOCATED IN THE SOUTHWESTERN CORNER OF THE SITE CONTAINS 40 DRUMS USED TO STORE LIQUID AND SOLID DIOXIN-CONTAMINATED WASTES. NINETEEN DRUMS CONTAIN APPROXIMATELY 650 GALLONS OF DIOXIN-CONTAMINATED LIQUID WASTES. FOURTEEN DRUMS CONTAIN APPROXIMATELY ONE CUBIC YARD OF DIOXIN-CONTAMINATED SOILS OR INVESTIGATION-DERIVED WASTES. THE REMAINING DRUMS ARE EMPTY. THESE MATERIALS WERE REMOVED FROM LOT 6 DURING A REMOVAL ACTION PERFORMED BY EPA IN 1986 AND ARE REFERRED TO HEREIN AS DIOXIN REMOVAL WASTES.

THE STUDY AREA INCLUDES ALL AREAS WHERE SAMPLING OR OTHER INVESTIGATIVE WORK WAS UNDERTAKEN, INCLUDING THE SITE AND THE PORTION OF THE SALT LAKE VALLEY IN WHICH THE HYDROGEOLOGY WAS EVALUATED AS PART OF THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS).

#SHEA

SITE HISTORY AND ENFORCEMENT ACTIVITIES

OPERATIONAL HISTORY

IN MAY 1957, WASATCH CHEMICAL COMPANY (WASATCH CHEMICAL) PURCHASED LOTS 4 AND 5 (SEE FIGURE 1.1). OPERATIONS INCLUDED PRODUCING SODIUM HYPOCHLORITE, REFILLING AND DISTRIBUTING CHLORINE AND AMMONIA CYLINDERS, AND PACKAGING AND DISTRIBUTING ACIDS, CAUSTICS, AND ORGANIC SOLVENTS. AN OUTDOOR FERRIC CHLORIDE PRODUCTION FACILITY WAS ALSO LOCATED AT THE SITE.

WASATCH CHEMICAL WAS PURCHASED BY MOUNTAIN FUEL SUPPLY COMPANY, INC. (MOUNTAIN FUEL) IN JUNE 1968. THE COMPANY WAS LATER MERGED INTO A SUBSIDIARY OF MOUNTAIN FUEL, ENTRADA INDUSTRIES.

(ENTRADA). ENTRADA, NOW A SEPARATE SUBSIDIARY OF MOUNTAIN FUEL'S PARENT COMPANY, QUESTAR CORPORATION, IS THE CURRENT OWNER OF THE WASATCH CHEMICAL PROPERTY. IN OCTOBER 1969, MOUNTAIN FUEL CONSOLIDATED WASATCH CHEMICAL'S OPERATIONS FROM ANOTHER OF ITS FACILITIES WHICH HAD FORMERLY BEEN LOCATED AT LOCATED AT 2225 SOUTH 500 EAST (NOW KNOWN AS THE WASATCH PLAZA SITE) WITH THE OPERATIONS AT THE WASATCH CHEMICAL SITE. IN CONNECTION WITH THIS CONSOLIDATION, PORTIONS OF LOTS 2 AND 3, AND ALL OF LOT 6 WERE PURCHASED. THE OTHER BUILDINGS CURRENTLY EXISTING AT THE SITE WERE BUILT DURING THAT EXPANSION. IN DECEMBER 1972, WASATCH CHEMICAL COMPLETED CONSTRUCTION OF THE FORMER EVAPORATION POND ON LOT 6. ACCORDING TO DESIGN DRAWINGS, ALL PROCESS WASTEWATER FROM SITE OPERATIONS WAS DIRECTED TO THE FORMER EVAPORATION POND.

AFTER THE 1969 CONSOLIDATION AND UNTIL JUNE 1978, WASATCH CHEMICAL FORMULATED, BLENDED, AND/OR PACKAGED VARIOUS CHEMICAL PRODUCTS AT THE PROPERTY, INCLUDING PESTICIDES, HERBICIDES, FERTILIZERS, INDUSTRIAL CHEMICALS, AND CLEANERS.

IN JUNE 1978, ENTRADA DIVESTED ITS AGRICULTURAL CHEMICAL BUSINESS AND RELATED ASSETS. AT THE SAME TIME, ENTRADA SOLD ITS INDUSTRIAL CHEMICAL AND CLEANER BUSINESS AND RELATED ASSETS TO GWCC. ALSO IN JUNE 1978, ENTRADA LEASED WITH AN OPTION TO PURCHASE LOTS 2 THROUGH 5 TO HUNTSMAN CHEMICAL AND OIL COMPANY, WHICH LATER BECAME THE HUNTSMAN-CHRISTENSEN CORPORATION (HUNTSMAN-CHRISTENSEN).

HUNTSMAN-CHRISTENSEN THEN SUBLEASED A PORTION OF THAT AREA TO GWCC. FROM JUNE 1978 TO JUNE 1982, HUNTSMAN-CHRISTENSEN SUBLEASED OTHER PORTIONS OF THE PROPERTY TO VARIOUS COMPANIES, INCLUDING LAWNLIFE CORPORATION, A LAWN-CARE SERVICE BUSINESS.

IN NOVEMBER AND DECEMBER OF 1980, THE FORMER EVAPORATION POND WAS COVERED WITH A CONCRETE TOP. ITS USE IS BELIEVED TO HAVE BEEN DISCONTINUED IN 1978.

ACCORDING TO A RISK ASSESSMENT CONDUCTED BY GWCC (RISK SCIENCE INTERNATIONAL, 1985), THE FOLLOWING ACTIVITIES CURRENTLY COMPRISE THE PRIMARY OPERATIONS ON-SITE:

CYLINDERS ARE FILLED WITH CHLORINE AND ANHYDROUS AMMONIA THROUGH A PIPING SYSTEM DIRECTLY FROM RAILROAD CARS. SODIUM HYPOCHLORITE AND AQUA-AMMONIA ARE PACKAGED IN DRUMS. HYDROCHLORIC ACID, SULFURIC ACID, AND SODIUM HYPOCHLORITE ARE PACKED IN 5-GALLON CONTAINERS. A DRY BLENDING OPERATION MANUFACTURES PROPRIETARY GOODS, PRIMARILY CLEANERS AND SANITIZERS. OUTSIDE THE BUILDINGS IS AN ALUMINUM NITRATE REACTOR THAT USES NITRIC ACID, HYDRATED ALUMINUM, AND WATER AS RAW MATERIALS. ALSO OUTSIDE IS A DRUMMING AREA WHERE DRUMS ARE FILLED WITH HYDROCHLORIC ACID, INHIBITED HYDROCHLORIC ACID, SULFURIC ACID, AND NITRIC ACID. HYDROCHLORIC ACID IS RECEIVED IN TANK TRUCKS, DILUTED WITH WATER, AND TRANSFERRED TO DRUMS.

THE SITE, THEN, WAS OPERATED PRIOR TO AND AFTER NOVEMBER 19, 1980, THE EFFECTIVE DATE OF THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA). THERE ARE CURRENTLY NO ON-SITE ACTIVITIES AT LOT 6. THAT PORTION OF THE SITE ON STEELCO PROPERTY IS UNDEVELOPED AND UNPAVED.

ACTIVITIES RESULTING IN RELEASES OF HAZARDOUS SUBSTANCES RELEASES OF HAZARDOUS SUBSTANCES AT THE SITE HAVE OCCURRED PRIMARILY DUE TO DISPOSAL PRACTICES AND SPILLS

THE FORMER EVAPORATION POND ON LOT 6 WAS USED FOR DISPOSAL OF PROCESS WASTEWATER FROM SITE OPERATIONS. IN 1980 THAT POND WAS FILLED WITH EARTHEN MATERIALS AND CAPPED WITH CONCRETE. THE ASSOCIATED DRAIN LINES CONTAIN HAZARDOUS SUBSTANCES, AS DO SEPTIC AND YARD DRAIN SYSTEMS AT THE SITE. CONTAMINANTS ARE BELIEVED TO HAVE MIGRATED FROM THESE DRAIN SYSTEMS INTO THE ENVIRONMENT.

THE FOLLOWING EXCERPTS FROM UDOH REPORTS HIGHLIGHT OTHER DISPOSAL ACTIVITIES AT THE SITE RESULTING IN RELEASES OF HAZARDOUS SUBSTANCES:

IN 1969, THREE UNLINED SETTLEMENT PONDS WERE REPORTEDLY USED FOR PROCESS WASTEWATER DISCHARGE. THE EXACT LOCATIONS OF THESE PONDS ARE UNKNOWN.

DURING 1969 AND 1970, A NEW SEPTIC TANK AND ABSORPTION FIELD WERE INSTALLED AT LOT 6.

INDUSTRIAL AND PROCESS WASTE MATERIALS WERE REPORTEDLY DISCHARGED TO A SEPTIC TANK AND DRAIN FIELD UNDERNEATH BUILDING C UNTIL JANUARY 5, 1970, WHEN WASTE LINES WERE REALIGNED.

IN 1978, THE CONNECTION WITH THE FORMER EVAPORATION POND WAS REPORTEDLY SEVERED AND GWCC'S WASTEWATER WAS DISCHARGED ONTO THE GROUND SURFACE THROUGH UNDERGROUND DRAINS OR FROM SURFACE RUNOFF.

BETWEEN JUNE 1978 AND JUNE 1982, TRUCKS CARRYING FERTILIZERS, HERBICIDES, AND PESTICIDES OWNED BY LAWLIFE CORPORATION REPORTEDLY ROUTINELY WASHED OUT THE INSIDES OF THE TANKS AND DRAINED THIS WASH WATER INTO THE YARD DRAINS LOCATED NEXT TO THE BOILER ROOM.

IN 1982, A WASTE AND WASTEWATER SURVEY WRITTEN BY GWCC INDICATED THAT WASTEWATER GENERATED FROM ALUMINUM NITRATE PRODUCTION AND CHLORINE CYLINDER RECONDITIONING WAS DUMPED ON THE GROUND. WASTE CLEAN-OUT WATER FROM WASACLOR AND AMMONIA TANKS WAS DISCHARGED TO THE RAILROAD TRACKS.

IN AUGUST 1983, GWCC INSTALLED A LINE TO THE SALT LAKE CITY SEWER FOR DISCHARGE OF WASTE MATERIAL. SALT LAKE CITY WAS NOT AWARE OF THIS CONNECTION UNTIL IT WAS DISCOVERED DURING ON-SITE VISITS IN THE SPRING OF 1986.

NUMEROUS SPILLS OF VARYING HAZARDOUS SUBSTANCES HAVE ALSO OCCURRED ON VARIOUS PARTS OF THE SITE.

CERCLA ENFORCEMENT HISTORY

INVESTIGATIONS TO DATE BY EPA AND UDOH HAVE IDENTIFIED TEN POTENTIALLY RESPONSIBLE PARTIES (PRPS) ASSOCIATED WITH THE WASATCH CHEMICAL SITE. THESE PRPS ARE ENTRADA INDUSTRIES, INC., MOUNTAIN FUEL SUPPLY COMPANY, INC., INTERSTATE BRICK COMPANY, AND QUESTAR CORPORATION (THE ENTRADA GROUP); MCCALL OIL AND CHEMICAL COMPANY, DFFI/A GREAT WESTERN CHEMICAL COMPANY (THE GREAT WESTERN GROUP); HUNTSMAN-CHRISTENSEN CORPORATION, LADD E. CHRISTENSEN, AND A. BLAINE HUNTSMAN, JR. (THE HUNTSMAN-CHRISTENSEN GROUP); LAWLIFE CORPORATION; AND PETER NG.

SIGNIFICANT CERCLA ENFORCEMENT-RELATED ACTIVITIES AT THE SITE INCLUDE THE FOLLOWING:

ON JANUARY 10, 1986, UDOH FILED A COMPLAINT IN US DISTRICT COURT REQUESTING THAT MEMBERS OF THE ENTRADA, HUNTSMAN-CHRISTENSEN, AND GREAT WESTERN GROUPS, TOGETHER WITH PETERING, BE COMPELLED BY THE COURT TO APPROPRIATELY DISPOSE OF DRUMS, CONTAINERS, CYLINDERS, AND CONTAMINATED SOILS AND WATERS ON LOT 6. EE UTAH DEPARTMENT OF HEALTH V~ PETER NG. ET AL., CIVIL NO. 86-C-0023G (D. UTAH).

ON FEBRUARY 7, 1986, EPA SENT NOTICE LETTERS TO LADD E. CHRISTENSEN, ENTRADA, GREAT WESTERN, MCCALL OIL, A. BLAINE HUNTSMAN, JR., MOUNTAIN FUEL AND PETER NG, INFORMING THEM OF THEIR LIABILITY FOR CLEANUP COSTS ASSOCIATED WITH REMOVAL ACTIVITIES CONDUCTED BY EPA ON LOT 6.

ON MARCH 13, 1986, EPA ISSUED A CERCLA UNILATERAL ADMINISTRATIVE ORDER TO PETER NG, HUNTSMAN-CHRISTENSEN CORPORATION, LADD E. CHRISTENSEN, AND A. BLAINE HUNTSMAN, JR., ORDERING THE REMOVAL OF DRUMS, CYLINDERS, AND CONTAINERS AND THE SAMPLING AND ANALYSIS OF SOILS AND WATER FOUND ON LOT 6.

ON APRIL 1, 1986, THE ENTRADA AND GREAT WESTERN GROUPS SIGNED AN ADMINISTRATIVE ORDER ON CONSENT WHICH REQUIRED THOSE PRPS TO REIMBURSE THE UNITED STATES FOR A PORTION OF THE RESPONSE AND OVERSIGHT COSTS ASSOCIATED WITH REMOVAL ACTIVITIES ON LOT 6.

ON JUNE 6, 1986, EPA COMPLETED AN EMERGENCY ACTION TO REMOVE DRUMS, CYLINDERS, AND CONTAMINATED MATERIALS FROM LOT 6.

ON JULY 2, 1986, UDOH AMENDED ITS ORIGINAL COMPLAINT, SEEKING TO COMPEL THE DEFENDANTS, INCLUDING THE HUNTSMAN-CHRISTENSEN, ENTRADA, AND GREAT WESTERN GROUPS TO CONDUCT AN RI/FS FOR THE WASATCH CHEMICAL SITE.

ON APRIL 4, 1988, THE ENTRADA GROUP ENTERED INTO A PARTIAL CONSENT DECREE WITH UDOH - DICTATING THAT ENTRADA WOULD UNDERTAKE THE RI/FS FOR THE ENTIRE WASATCH CHEMICAL SITE. THE RI/FS WAS COMPLETED IN OCTOBER 1990.

EFFECTIVE JUNE 26, 1990, THE HUNTSMAN-CHRISTENSEN, ENTRADA, AND GREAT WESTERN GROUPS ENTERED INTO AN ADMINISTRATIVE SETTLEMENT AGREEMENT WITH EPA. ITS TERMS INCLUDED REIMBURSEMENT OF EPA RESPONSE AND OVERSIGHT COSTS INCURRED PRIOR TO JUNE 6, 1986 AT THE LOT 6 PORTION OF THE WASATCH CHEMICAL SITE.

RCRA ENFORCEMENT HISTORY

THE RCRA ENFORCEMENT HISTORY OF THE SITE APPLIES MAINLY TO OPERATIONS CONDUCTED BY GWCC (ENTRADA CEASED OPERATIONS AT THE SITE PRIOR TO THE EFFECTIVE DATE OF RCRA). GWCC SUBMITTED A RCA PART A HAZARDOUS WASTE PERMIT APPLICATION ON NOVEMBER 19, 1980 AND SUBSEQUENTLY OPERATED AN INTERIM STATUS HAZARDOUS WASTE STORAGE FACILITY AT THE SITE. IN ADDITION TO STORING HAZARDOUS WASTE, GWCC HAS ALSO TREATED RCRA CHARACTERISTIC HAZARDOUS WASTE (D002) IN AN ELEMENTARY NEUTRALIZATION UNIT (ENU). DISCHARGE FROM THE ENU HAS BEEN TO THE SALT LAKE CITY SEWER SYSTEM.

GWCC HAS RECEIVED SEVERAL NOTICES OF VIOLATION (NOVS) FROM UDOH. VIOLATIONS CITED INCLUDE INADEQUATE FINANCIAL ASSURANCE GUARANTEES (FEBRUARY 3, 1983), INADEQUATE EMPLOYEE TRAINING AND ALARM SYSTEM (MAY 4, 1984), AND FAILURE TO SUBMIT & BIENNIAL REPORT FOR 1987 (AUGUST 12, 1988). ON OCTOBER 3, 1986, GWCC WAS ISSUED & NOV AND COMPLIANCE ORDER BECAUSE IT WAS STORING HAZARDOUS WASTE IN EXCESS OF THE DESIGN CAPACITY OF THE STORAGE FACILITY AS SPECIFIED IN THE PART A PERMIT APPLICATION. A STIPULATION AND CONSENT ORDER RESOLVING THE OCTOBER 3, 1986 NOV AND COMPLIANCE ORDER WAS SIGNED BY GWCC ON AUGUST 27, 1987.

ON SEPTEMBER 28, 1989, GWCC NOTIFIED UDOH OF ITS INTENT TO CLOSE ITS RCRA PART A INTERIM STATUS STORAGE FACILITY. ALTHOUGH THE STORAGE AREA REMAINS UNUSED, GWCC HAS NOT CLOSED THAT FACILITY UNDER RCRA. CLOSURE OF THE STORAGE FACILITY WILL OCCUR DURING THE CERCLA ACTION. ALL RCRA CLOSURE REQUIREMENTS WILL BE MET AND IT IS INTENDED THAT FORMAL RCRA CLOSURE WILL BE ACCOMPLISHED SIMULTANEOUSLY THROUGH COORDINATION WITH RCRA AUTHORITIES.

#HCP

HIGHLIGHTS OF COMMUNITY PARTICIPATION

THE RI/FS REPORT AND THE PROPOSED PLAN FOR THE WASATCH CHEMICAL SITE WERE RELEASED TO THE PUBLIC FOR COMMENT ON OCTOBER 9, 1990. THESE TWO DOCUMENTS WERE MADE AVAILABLE TO THE PUBLIC IN THE ADMINISTRATIVE RECORD. THE ADMINISTRATIVE RECORD IS MAINTAINED AT THREE LOCATIONS: ON THE THIRD FLOOR OF THE CANNON HEALTH BUILDING IN SALT LAKE CITY; THE CHAPMAN BRANCH OF THE SALT LAKE CITY PUBLIC LIBRARY; AND THE EPA REGION VIII SUPERFUND RECORDS CENTER IN DENVER, COLORADO. THE NOTICE OF AVAILABILITY FOR THE ILLIF'S REPORT, THE PROPOSED PLAN AND OTHER DOCUMENTS IN THE ADMINISTRATIVE RECORD WAS PUBLISHED IN THE DESERT NEWS AND THE SALT LAKE CITY TRIBUNE ON OCTOBER 7, 1990. A PUBLIC COMMENT PERIOD ON THE DOCUMENTS WAS HELD FROM OCTOBER 9, 1990 TO NOVEMBER 8, 1990. IN ADDITION, A PUBLIC MEETING WAS HELD ON OCTOBER 18, 1990 AT UDOH IN SALT LAKE CITY. AT THIS MEETING, THE PUBLIC WAS INVITED TO PROVIDE COMMENTS ON THE PROPOSED PLAN AND TO ASK QUESTIONS OF EPA AND UDOH REPRESENTATIVES ABOUT THE SITE AND THE REMEDIAL ALTERNATIVES UNDER CONSIDERATION. A RESPONSE TO THE COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD IS INCLUDED IN THE RESPONSIVENESS SUMMARY WHICH IS PART OF THIS ROD. THIS DECISION DOCUMENT PRESENTS THE SELECTED REMEDIAL ACTION FOR THE WASATCH CHEMICAL SITE IN SALT LAKE CITY, UTAH, CHOSEN IN ACCORDANCE WITH CERCLA, AS AMENDED BY SARA, AND THE NCP. THE REMEDIAL ACTION DECISION FOR THIS SITE IS BASED ON THE ADMINISTRATIVE RECORD.

#SROU

SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION WITHIN SITE STRATEGY

THE PRINCIPAL THREATS POSED BY CONDITIONS AT THE SITE, WHICH INCLUDE SOILS CONTAMINATION, SLUDGES, DIOXIN REMOVAL WASTES, AND THE PORTION OF CONTAMINATED GROUND WATER THAT IS CURRENTLY KNOWN TO ORIGINATE FROM THE SITE, ARE ADDRESSED IN ONE OPERABLE UNIT FOR THE SITE. THE GROUND WATER PORTION OF THE REMEDY FOR THE SITE, HOWEVER, IS SUBJECT TO POSSIBLE FUTURE MODIFICATION BECAUSE CERTAIN PORTIONS OF GROUND WATER REMAIN UNCHARACTERIZED. THE GROUND WATER PORTION OF THE REMEDY IS FINAL FOR CONTAMINATED GROUND WATER UNDERLYING THE WASATCH CHEMICAL PROPERTY AND THE SOUTHERN PORTION OF THE STEELCO PROPERTY. HOWEVER, CONTAMINATED GROUND WATER UNDERLYING THE NORTHERN PORTION OF THE STEELCO PROPERTY HAS NOT BEEN FULLY CHARACTERIZED. NO REMEDY WILL BE FINALIZED FOR THE CONTAMINATED GROUND WATER UNDERLYING THE NORTHERN PORTION OF THE STEELCO PROPERTY UNTIL IT HAS BEEN ADEQUATELY CHARACTERIZED. FURTHER INVESTIGATIONS AND SUBSEQUENT REMEDIAL DECISIONS REGARDING GROUND WATER BENEATH THE NORTHERN PORTION OF THE STEELCO PROPERTY MAY NECESSITATE FUTURE MODIFICATION OF THE GROUND WATER REMEDY FOR THE WASATCH CHEMICAL PROPERTY AND THE SOUTHERN PORTION OF THE STEELCO PROPERTY, OR OTHER REMEDIAL ACTION.

IF ANY RESIDUAL CONTAMINATION PRESENT IN ANY OF THE BUILDINGS ON-SITE, OR ANY SOILS OR DEBRIS RESULTING FROM DEMOLITION OF THE BUILDINGS ON-SITE, IS NOT ADDRESSED IN THE REMEDIAL ACTION, UDOH PLANS TO ADDRESS THIS CONTAMINATION, SOILS OR DEBRIS UNDER OTHER STATUTORY AUTHORITY.

#SSC

SUMMARY OF SITE CHARACTERISTICS

CONTAMINATION AT THE SITE MAY BE DIVIDED INTO THREE CATEGORIES: SOILS, SOURCE AREAS, AND GROUND WATER. SOURCE MATERIALS AT THE SITE INCLUDE THE SLUDGES IN THE FORMER EVAPORATION POND AND THREE DRAIN SYSTEMS, AND THE DIOXIN REMOVAL WASTES STORED IN THE DIOXIN STORAGE TRAILER DURING THE REMOVAL ACTION CONDUCTED BY EPA IN 1986. THESE SOURCES OF CONTAMINATION ARE DESCRIBED IN THE SUBSECTION IMMEDIATELY BELOW. THE TYPES AND NATURE OF ALL CONTAMINANTS FOUND ON-SITE ARE DESCRIBED IN THE NEXT SUBSECTION, NATURE OF CONTAMINATION. FINALLY, THE EXTENT OF CONTAMINATION FOUND IN SOILS AND GROUND WATER IS DESCRIBED IN THE EXTENT OF CONTAMINANTS SUBSECTION.

TABLE 5.1 CONTAINS A LIST OF THE COMPOUND CLASSES OF CONTAMINANTS FOUND AT THE SITE, A LIST OF INDICATOR CHEMICALS USED FOR EACH OF THOSE CLASSES, AND A DESCRIPTION OF THE TOXICITY AND MOBILITY CHARACTERISTICS OF THE INDICATOR CHEMICALS. THE DEFINITION AND SIGNIFICANCE OF INDICATOR CHEMICALS IS FURTHER DESCRIBED IN NATURE OF CONTAMINATION, BELOW.

SOURCES OF CONTAMINATION

THE PROCESS DRAIN SYSTEM (INCLUDING THE FORMER EVAPORATION POND), YARD DRAIN SYSTEM, AND SEPTIC SYSTEM FOUND ON LOT 6 CONSTITUTE THE MAJOR SOURCES OF CONTAMINATION PRESENTLY FOUND ON THE SITE. THESE SYSTEMS, TOGETHER WITH ADDITIONAL SOURCE MATERIAL, ARE DESCRIBED BELOW.

DURING SITE OPERATIONS, THE PROCESS DRAIN SYSTEM CARRIED PROCESS WASTEWATER FROM OPERATIONAL AREAS TO A SUMP. THE WASTEWATER WAS THEN PUMPED FROM THE SUMP INTO THE FORMER EVAPORATION POND AT LOT 6. SAMPLES TAKEN FROM THE PROCESS DRAIN SYSTEM CONTAINED HIGH LEVELS OF PESTICIDES, HERBICIDES, DIOXIN, SEMIVOLATILE ORGANIC COMPOUNDS (SVOCs), AND VOLATILE ORGANIC COMPOUNDS (VOCs). THE FORMER EVAPORATION POND, CONNECTED TO THE PROCESS DRAIN SYSTEM, IS CONSIDERED A SOURCE AREA BECAUSE IT RECEIVED PROCESS WASTEWATER.

PROCESS WASTE MATERIAL WHICH WAS DISCHARGED TO THE FORMER EVAPORATION POND MAY HAVE CONTAINED ANY OF THE CHEMICALS USED ON-SITE. THE FORMER EVAPORATION POND, WHICH WAS CONSTRUCTED OF CONCRETE, WAS FILLED WITH EARTHEN MATERIALS AND COVERED WITH A CONCRETE TOP AT THE END OF 1980. THE DISTANCE BETWEEN THE BASE OF THE POND AND THE GROUND WATER TABLE VARIES BETWEEN 0 AND 4 FEET. THE CURRENT INTEGRITY OF THE POND IS QUESTIONABLE: GROUND WATER NEAR THE POND IS CONTAMINATED BY SOLVENTS WHICH MAY HAVE LEAKED FROM THE POND. SOLVENTS MAY ALSO HAVE LEAKED FROM THE PROCESS DRAIN LINES.

THE NORTHERN PORTION OF THE YARD DRAIN SYSTEM, WHICH RECEIVES SURFACE RUNOFF FROM THE SITE, IS CONSIDERED A POTENTIAL SOURCE BECAUSE ELEVATED CONTAMINANT LEVELS HAVE BEEN DETECTED IN THE SYSTEM.

RUNOFF AND DRAINAGE FROM SURFACE CHEMICAL SPILLS ARE SUSPECTED ORIGINS OF THIS CONTAMINATION. THE SEPTIC SYSTEM ON LOT 6, WHICH INCLUDES A LEACH FIELD ON THAT LOT, ALSO SHOWS EVIDENCE OF CONTAMINATION. BOTH THE YARD DRAIN AND SEPTIC SYSTEMS CONTAIN A WIDE VARIETY OF CONTAMINANTS AT ELEVATED LEVELS.

TABLE 5.2 SHOWS MAXIMUM CONCENTRATIONS OF INDICATOR CHEMICALS IN SLUDGES FOUND IN THE ABOVE-DESCRIBED SYSTEMS COMPARED TO ACTION LEVELS. THE ESTIMATED VOLUMES OF MATERIAL, INCLUDING SLUDGES, REQUIRING REMEDIATION IN EACH AREA OF THE SITE ARE LISTED IN TABLE 5.3.

FINALLY, THE DIOXIN REMOVAL WASTES CONSTITUTE ADDITIONAL SOURCE MATERIAL FOUND AT THE SITE. DURING THE REMOVAL ACTION CONDUCTED BY EPA IN 1986, SURFACE SOILS CONTAMINATED BY MATERIALS LEAKING FROM SOME OF THE ORIGINAL DRUMS FOUND ON LOT 6 WERE EXCAVATED AND DRUMMED. THE LEAKING DRUMS WERE SAMPLED AND PLACED IN OVERPACK DRUMS. THOSE DRUMS, TOGETHER WITH DRUMS CONTAINING EXCAVATED SOILS, WERE STORED IN THE DIOXIN STORAGE TRAILER UNTIL A FINAL DISPOSAL METHOD COULD BE FOUND. FURTHER SAMPLING OF SOILS AS A RESULT OF EPA'S "MAKE SITES SAFE" INITIATIVE IN AUGUST 1990 FOUND HIGH LEVELS OF DIOXIN (2,3,7,8-TCDD) REMAINING IN THE AREA ON LOT 6 WHICH WAS THE SUBJECT OF THE 1986 REMOVAL. A FURTHER REMOVAL ACTION SUBSEQUENT TO THE AUGUST 1990 SAMPLING EVENT IS CURRENTLY UNDERWAY TO STABILIZE CONTAMINANTS FOUND IN THIS AREA UNTIL REMEDIATION OCCURS. NO OFF-SITE DISPOSAL FACILITY HAS BEEN PERMITTED TO ACCEPT DIOXIN OR DIOXIN-CONTAMINATED MATERIALS.

NATURE OF CONTAMINATION

A WIDE VARIETY OF CONTAMINANTS WAS FOUND AT THE SITE. IN ORDER TO EFFECTIVELY MANAGE THE EVALUATION OF HEALTH AND ENVIRONMENTAL RISKS, CONTAMINANTS WERE GROUPED ACCORDING TO CHEMICAL CLASSIFICATION AND INDICATOR CHEMICALS WERE SELECTED FROM EACH GROUP. INDICATOR CHEMICALS REPRESENT THE MOST PREVALENT, MOBILE, PERSISTENT, AND TOXIC COMPOUNDS FOUND AT THE SITE. HEALTH-BASED CLEANUP OR ACTION LEVELS WERE CALCULATED FOR

THESE INDICATOR CHEMICALS. THE ACTION LEVEL FOR DIOXIN WAS BASED ON DETERMINATIONS AT OTHER SITES THAT THE 20 PARTS PER BILLION LEVEL IS PROTECTIVE FOR AN INDUSTRIAL SCENARIO. THE INDUSTRIAL SCENARIO IS APPROPRIATE FOR THE SITE, GIVEN THE SITE'S LIKELY USE IN THE FORESEEABLE FUTURE. INDICATOR CHEMICALS ARE USED THROUGHOUT THE ROD TO DESCRIBE CONTAMINATION AT THE SITE.

EXTENT OF CONTAMINANTS

ASIDE FROM THE SOURCE AREAS DESCRIBED ABOVE, CONTAMINANTS AT THE SITE OCCUR IN SOILS AND GROUND WATER.

THE EXTENT OF SOILS CONTAMINATION IS WIDESPREAD AND IS DEPICTED IN FIGURE 5.1. SAMPLING BY UDOH DURING SITE INVESTIGATIONS IN 1986 AND 1987 INDICATED THAT SURFACE SOILS ON LOT 6 WERE CONTAMINATED WITH PESTICIDES (NOTABLY CHLORDANE AND HEPTACHLOR), AND POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS). BASED ON THE RESULTS OF SOILS SAMPLING PERFORMED DURING THE REMEDIAL INVESTIGATION, IT WAS DETERMINED THAT AREAS OF ELEVATED CONCENTRATIONS OF CONTAMINANTS EXIST ON LOT 6. ALTHOUGH LOT 6 IS NOT CURRENTLY BEING USED AND ACCESS TO IT IS RESTRICTED BY FENCING, THE PATTERN OF CONTAMINANT DISTRIBUTION MAY BE THE RESULT OF VEHICULAR AND FOOT TRAFFIC ASSOCIATED WITH THE PAST USE OF THE PROPERTY AND PAST STORAGE OF DRUMS IN CERTAIN AREAS.

SEVERAL TOPOGRAPHICALLY LOW POINTS ON-SITE COLLECT WATER DURING PART OF THE YEAR. THESE AREAS LIE ALONG THE EASTERN BOUNDARY OF THE SITE AND REPRESENT AREAS IN WHICH CONTAMINANTS TRANSPORTED BY RUNOFF OR SPILLS ACCUMULATE. ACIDS AND BASES HAVE BEEN SPILLED IN THE REGION ALONG THE RAIL SPUR DURING LOADING AND UNLOADING. BECAUSE THE FORMER PROCESS DRAIN LINE, WHICH ORIGINATES AT THE PESTICIDE AND FERTILIZER BUILDINGS, RUNS ALONG THE RAIL SPUR, THIS AREA HAS RECEIVED A VARIETY OF CONTAMINANTS. WITH THE EXCEPTION OF TCDD LEVELS FOUND AS A RESULT OF THE "MAKE SITES SAFE" INITIATIVE, THE HIGHEST LEVELS OF DIOXINS FURANS, AND SEVERAL OTHER CONTAMINANTS FOUND AT THE SITE WERE DETECTED IN SOILS SAMPLES COLLECTED AT THE HEAD OF THE PROCESS DRAIN. GREEN LAKE (A TOPOGRAPHICAL DEPRESSION LOCATED IN THE SOUTHEAST CORNER OF THE SITE WHICH SOMETIMES CONTAINS PONDED WATER) IS BELIEVED TO HAVE ACCUMULATED CONTAMINANTS CARRIED THERE BY SURFACE WATER RUNOFF FROM THE PROCESS AREAS OF THE SITE.

ADDITIONALLY, SOILS IN THE DRUM HANDLING AREA ARE CONTAMINATED WITH HYDROCARBONS, PARTICULARLY XYLENE AND TOLUENE, TO A DEPTH OF APPROXIMATELY 4 FEET.

CONCENTRATIONS AND ACTION LEVELS FOR INDICATOR CHEMICALS IN SOILS ARE SHOWN IN TABLE 5.2. THE ESTIMATED VOLUMES OF SOILS THAT REQUIRE REMEDIATION IN RICH AREA OF THE SITE ARE LISTED IN TABLE 5.3.

THE PRIMARY CONTAMINANTS OF CONCERN IN GROUND WATER ARE THE INDICATOR CHEMICALS TCE, PCE, PCP, AND 2,4-D. CONCENTRATIONS FOR GROUND WATER INDICATOR CHEMICALS ARE LISTED IN TABLE 5.4.

AS SHOWN IN FIGURE 5.2, KNOWN GROUND WATER CONTAMINATION IS WIDELY DISPERSED THROUGHOUT THE SITE. THE EXTENT AND ORIGIN OF CONTAMINATED GROUND WATER FOUND ON THE NORTHERN PORTION OF THE STEELCO PROPERTY HAS NOT BEEN FULLY CHARACTERIZED. FURTHER INVESTIGATIONS AND SUBSEQUENT REMEDIAL DECISIONS REGARDING GROUND WATER AT THE STEELCO PROPERTY ARE EXPECTED TO BE COMPLETED BEFORE THE INITIATION OF THE REMEDIAL ACTION.

BECAUSE THE GROUND WATER CONTAMINANTS ARE IN THE AQUEOUS PHASE, THE VERTICAL EXTENT OF GROUND WATER CONTAMINATION IS ASSUMED TO BE CONTINUOUS THROUGHOUT THE SHALLOW PORTION OF THE AQUIFER. THE SHALLOW PORTION OF THE AQUIFER IS APPROXIMATELY 18 FEET THICK AND EXTENDS FROM LAND SURFACE TO THE CONFINING UNIT WHICH SEPARATES THE SHALLOW AND DEEP PORTIONS OF THE REGIONAL AQUIFER. A MONITORING WELL HAS BEEN INSTALLED AT A DEPTH OF 40 FEET. PRELIMINARY ANALYSIS OF SAMPLES FROM THIS WELL SHOWS NO CONTAMINATION.

BASED ON INFORMATION OBTAINED FROM FIELD INVESTIGATIONS AND CONCEPTUAL FLOW MODELING. THE VOLUME OF GROUND WATER TO BE REMEDIATED IS ESTIMATED AT 20.4 MILLION GALLONS. THIS DOES NOT INCLUDE UNCHARACTERIZED GROUND WATER ON THE NORTHERN PORTION OF THE STEELCO PROPERTY. POTENTIAL ROUTES OF CONTAMINANT MIGRATION AND POPULATION AND ENVIRONMENTAL AREAS THAT COULD BE AFFECTED BY THE CONTAMINANTS ARE DESCRIBED IN SECTION 6.

#SSR

SUMMARY OF SITE RISKS

THIS SECTION IS A SUMMARY OF THE INFORMATION USED TO CHARACTERIZE THE RISKS TO HUMAN HEALTH AND THE ENVIRONMENT POSED BY CONDITIONS AT THE SITE. DOCUMENTS CONCERNING SITE RISKS, WHICH WERE PREPARED BY ENTRADA, EPA, AND UDOH, MAY BE FOUND IN THE ADMINISTRATIVE RECORD FOR THE SITE. THE INFORMATION PRESENTED IN THIS SECTION SUPPORTS THE DECISION TO TAKE REMEDIAL ACTION DUE TO ACTUAL OR THREATENED RELEASES OF HAZARDOUS SUBSTANCES.

ALTHOUGH CURRENT RISKS WERE ANALYZED, IT WAS DETERMINED THAT FUTURE POTENTIAL RISKS WERE OF GREATEST CONCERN. IN ANALYZING THESE FUTURE POTENTIAL RISKS, THE ASSUMPTION WAS MADE THAT THE INTEGRITY OF THE SUBSURFACE DRAIN SYSTEM, WHICH CURRENTLY INHIBITS MOVEMENT OF CONTAMINANTS CONTAINED THEREIN TO THE EXTERNAL ENVIRONMENT, WILL BE BREACHED AT SOME TIME IN THE FUTURE AND THAT THESE CONTAMINANTS WILL THEREFORE BE MADE AVAILABLE FOR

EXPOSURE TO WORKERS.

HUMAN HEALTH RISKS

CONTAMINANTS AND SITE MEDIA

THE FOLLOWING MEDIA AT THE SITE WERE EVALUATED TO DETERMINE WHAT LEVEL OF RISK CONTAMINATION IN EACH PRESENTS TO HUMAN HEALTH:

SOILS

LIQUIDS AND SLUDGES ASSOCIATED WITH THE FORMER PROCESS DRAIN SYSTEM (SOURCE AREA)

LIQUIDS AND SLUDGES PRESENT IN THE ACTIVE STORM WATER DRAINAGE SYSTEM (SOURCE AREA)

GROUND WATER

AIR

SURFACE WATER (IN THE 700 WEST DITCH AND AREAS OF PONDED WATER ON-SITE)

SEDIMENTS (IN THE 700 WEST DITCH)

AS DESCRIBED IN SUMMARY OF SITE CHARACTERISTICS (SECTION 5), SOILS, SOURCE AREAS, AND GROUND WATER HAVE BEEN DETERMINED TO BE THE MEDIA OF CONCERN.

TABLE 5.1 LISTS INDICATOR CHEMICALS CHOSEN FROM AMONG THE CONTAMINANTS DETECTED AT THE SITE TO REPRESENT THE MOST PREVALENT, MOBILE, TOXIC, AND PERSISTENT CONTAMINANTS.

CONTAMINANT CONCENTRATIONS USED IN POTENTIAL FUTURE RISK CALCULATIONS WERE 95TH PERCENTILE UPPER CONFIDENCE LIMITS ON THE GEOMETRIC MEAN.

EXPOSURE ASSESSMENT

THE EXPOSURE ASSESSMENT WAS COMPLETED IN TWO STEPS. INITIALLY, THE ENDANGERMENT ASSESSMENT (EA) WAS CONDUCTED BY ENTRADA. THIS DOCUMENT EVALUATED CURRENT EXPOSURE ONLY. IT WAS FOLLOWED UP WITH SUBSEQUENT WORK BY ENTRADA AND EPA, WHICH EVALUATED POTENTIAL FUTURE RISK. THE EXPOSURE PATHWAYS, RECEPTOR POPULATIONS, EXPOSURE POINT CONCENTRATIONS, AND EXPOSURE ASSUMPTIONS FOR EACH STEP OF THE LATTER EVALUATION (WHICH INCORPORATES SOME ASSUMPTIONS FROM THE EA EVALUATION) ARE SUMMARIZED BELOW AND SHOWN IN TABLE 6.1.

THREE POTENTIAL RECEPTOR POPULATIONS WERE INITIALLY IDENTIFIED IN THE EA DATED JANUARY 26, 1990. THESE INCLUDED AN OFF-SITE RESIDENTIAL POPULATION, AN OFF-SITE WORKER POPULATION, AND AN ON-SITE WORKER POPULATION. INGESTION, INHALATION, AND DIRECT DERMAL CONTACT WERE INVESTIGATED AS EXPOSURE ROUTES. ONLY INGESTION AND DIRECT DERMAL CONTACT WERE FOUND TO BE PATHWAYS OF POTENTIALLY SIGNIFICANT EXPOSURE. RISK ESTIMATES ASSOCIATED WITH INHALATION INDICATE THAT INHALATION WOULD CONTRIBUTE LITTLE TO OVERALL SITE-RELATED RISKS.

IN THE EA, THE OFF-SITE RESIDENTIAL POPULATION WAS ASSUMED TO RESIDE ONE-FOURTH MILE NORTHWEST OF THE SITE IN THE PREDOMINANT DOWNWIND DIRECTION FROM THE SITE AND INCLUDE CHILDREN BETWEEN THE AGES OF 1 AND 17 AND ADULTS BETWEEN THE AGES OF 18 AND 70. THIS POPULATION WAS ASSUMED TO RESIDE AT THE SAME LOCATION FOR A 70-YEAR LIFETIME. THE RESIDENTIAL POPULATION WAS EVALUATED FOR RISKS FROM INHALATION EXPOSURE TO AIRBORNE CONTAMINANTS, INCLUDING FUGITIVE DUST AND CHEMICALS VOLATILIZING FROM SOILS AND GROUND WATER. EPA USED SIMILAR ASSUMPTIONS IN EVALUATING RISKS DUE TO THE INGESTION OF GROUND WATER.

CURRENT RISKS

THE OFF-SITE WORKER POPULATION WAS ASSUMED, IN THE EA, TO WORK JUST NORTH OF LOT 6 AND BE CONTINUOUSLY EXPOSED TO INHALATION OF CONTAMINANTS VIA VOLATILIZATION AND DUST EMISSIONS.

ALSO FOR PURPOSES OF THE EA, IT WAS ASSUMED THAT ON-SITE WORKERS DO NOT HAVE ACCESS TO LOT 6, WHICH IS SURROUNDED BY A CYCLONE FENCE. THEREFORE, DERMAL AND INCIDENTAL INGESTION EXPOSURES WERE EVALUATED ONLY FOR CONTAMINANTS ON LOTS 2 THROUGH 5. HOWEVER, IT WAS ASSUMED THAT ON-SITE WORKERS COULD INHALE DUST AND VOLATILE EMISSIONS EMANATING FROM LOT 6.

ALL WORKERS WERE ASSUMED TO BE EMPLOYED FOR 8 HOURS PER DAY FOR 10 YEARS IN THE TYPICAL EXPOSURE AND 30 YEARS IN THE REASONABLE MAXIMUM EXPOSURE. INCIDENTAL INGESTION FOR ON-SITE WORKERS WAS EVALUATED USING ON-SITE SURFACE (0-6 INCHES) SOILS CONCENTRATIONS FOR ALL INDICATOR CHEMICALS. THE GEOMETRIC MEAN SURFACE SOILS

CONCENTRATIONS FOR THE UNPAVED AREAS ON LOTS 2-5 WERE USED TO EVALUATE CURRENT EXPOSURES FOR A TYPICAL AND REASONABLE MAXIMUM SCENARIO.

THE EA PREPARED BY ENTRADA CONCLUDED THERE ARE NO SIGNIFICANT CURRENT RISKS AT THE SITE.

ALTHOUGH NOT GUARANTEED, CONTINUED USE OF THE SITE IN AN INDUSTRIAL CAPACITY IS MOST LIKELY BECAUSE OF ITS LOCATION IN AN INDUSTRIAL AREA OF SALT LAKE CITY AND LAND USE CONSTRAINTS.

FUTURE POTENTIAL RISKS

SUBSEQUENT CALCULATIONS WERE PERFORMED TO FURTHER EVALUATE FUTURE ON-SITE WORKER AND RESIDENTIAL EXPOSURES, AND ACUTE EXPOSURES.

FOR THE FURTHER EVALUATION OF FUTURE EXPOSURES, ON-SITE WORKERS WERE ASSUMED TO HAVE FULL ACCESS TO LOT 6. THEREFORE, THE GEOMETRIC MEAN SURFACE SOILS CONCENTRATIONS FOR UNPAVED AREAS IN LOTS 2-6 WERE USED. TO MORE CLOSELY CONFORM WITH EPA SUPERFUND RISK ASSESSMENT GUIDANCE, THE 95 PERCENT CONFIDENCE LIMIT OF THE GEOMETRIC MEAN WAS USED IN SUBSEQUENT RISK CALCULATIONS. ADDITIONAL EVALUATIONS WERE PERFORMED BY EPA TO ASSESS POTENTIAL ACUTE AND/OR SUBCHRONIC EXPOSURE RISKS ASSOCIATED WITH DIRECT EXPOSURE TO CONTAMINANTS FOUND IN SLUDGES IN THE PROCESS AND YARD DRAIN SYSTEMS. IT WAS ASSUMED THAT THE INTEGRITY OF THE SUBSURFACE DRAIN SYSTEM, WHICH CURRENTLY INHIBITS MOVEMENT OF CONTAMINANTS CONTAINED THEREIN TO THE EXTERNAL ENVIRONMENT, WOULD BE BREACHED AT SOME TIME IN THE FUTURE AND THAT THESE CONTAMINANTS WOULD THEREFORE BE MADE AVAILABLE FOR EXPOSURE TO WORKERS. EXPOSURE TO THESE SLUDGES COULD REASONABLY OCCUR FOR WORKERS INVOLVED IN THE REPAIR OR REMOVAL OF THE DRAIN SYSTEMS. A PRELIMINARY ANALYSIS INDICATED THE POTENTIAL FOR SUBSTANTIAL EXPOSURE, BOTH DERMAL AND VIA INCIDENTAL INGESTION. THE GREATEST POTENTIAL HAZARD APPEARED TO BE ASSOCIATED WITH DERMAL EXPOSURE TO CHLORDANE-CONTAMINATED SLUDGES.

THE POTENTIAL FOR DERMAL CONTACT WITH ON-SITE SURFACE SOILS WAS ALSO EVALUATED IN SUBSEQUENT WORK. THE SAME SOILS CONCENTRATIONS USED IN CALCULATING INGESTION EXPOSURES WERE USED TO EVALUATE DERMAL EXPOSURES (FOR EXAMPLE, SURFACE SOILS CONCENTRATIONS FOR UNPAVED AREAS IN LOTS 2-6).

THE EA PREPARED BY ENTRADA CONCLUDED THAT THERE IS NO EXISTING OR POTENTIAL RECEPTOR POPULATION FOR GROUND WATER CONTAMINATED BY SITE CONTAMINANTS. THEREFORE, NO GROUND WATER EXPOSURE ASSESSMENT WAS PERFORMED IN THE EA. HOWEVER, EPA AND UDOH DISAGREED WITH THIS CONCLUSION, AND DETERMINED, BASED ON ON-SITE HYDROGEOLOGY, THAT A POTENTIAL FOR FUTURE HUMAN EXPOSURE TO CONTAMINATED GROUND WATER DOES EXIST. THEREFORE MCLS ESTABLISHED UNDER THE SAFE DRINKING WATER ACT ARE CONSIDERED TO BE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) AND PROPOSED MCLS ARE TO BE CONSIDERED (TBCS). MCLS AND PROPOSED MCLS WERE THEREFORE ADOPTED AS GROUND WATER CLEANUP STANDARDS FULLY PROTECTIVE OF HUMAN HEALTH. (SEE SECTION 8 FOR A FULL EXPLANATION OF ARARS.). THE REGULATORY AGENCIES ALSO DETERMINED THAT SOME PRELIMINARY RISK ANALYSIS SHOULD BE CARRIED OUT TO ILLUSTRATE POSSIBLE FUTURE EXPOSURES AND ACCOMPANYING RISKS. THIS ANALYSIS EVALUATED FUTURE USES OF GROUND WATER INCLUDING INGESTION OF GROUND WATER BY FUTURE WORKERS USING A SHALLOW WELL IN THE CONTAMINATED AQUIFER, AND HOUSEHOLD USE OF GROUND WATER BY RESIDENTS OBTAINING WATER FROM THE SHALLOW PORTION OF THE AQUIFER. RESIDENTS WOULD MOST LIKELY BE EXPOSED VIA INGESTION OF CONTAMINATED GROUND WATER AS WELL AS BY INHALING VAPORS WHILE SHOWERING AND COOKING.

TOXICITY ASSESSMENT

THE TOXICITY OF CHEMICALS IS EVALUATED IN TERMS OF CARCINOGENICITY AND OTHER, NONCARCINOGENIC EFFECTS. CANCER POTENCY FACTORS FOR CARCINOGENIC CHEMICALS AND REFERENCE DOSES FOR NONCARCINOGENIC CHEMICALS ARE USED TO EVALUATE RISKS POSED BY THE EXPOSURE TO CHEMICALS.

CANCER POTENCY FACTORS (CPFS), ALSO KNOWN AS SLOPE FACTORS, HAVE BEEN DEVELOPED BY EPA'S CARCINOGENIC ASSESSMENT GROUP. SLOPE FACTORS ESTIMATE EXCESS LIFETIME CANCER RISKS ASSOCIATED WITH EXPOSURE TO POTENTIALLY CARCINOGENIC CHEMICALS. SLOPE FACTORS ARE DERIVED FROM THE RESULTS OF HUMAN EPIDEMIOLOGICAL STUDIES OR CHRONIC ANIMAL BIOASSAYS TO WHICH ANIMAL-TO-HUMAN EXTRAPOLATION AND UNCERTAINTY FACTORS HAVE BEEN APPLIED. EPA-ESTABLISHED SLOPE FACTORS FOR INHALATION AND INGESTION EXPOSURES ARE PRESENTED IN TABLE 6.2. THE SLOPE FACTOR FOR A GIVEN COMPOUND IS MULTIPLIED BY THE ESTIMATED DOSE TO OBTAIN THE CARCINOGENIC RISK ESTIMATE. THE INDIVIDUAL RISKS FROM EACH COMPOUND IN A PARTICULAR EXPOSURE PATHWAY ARE THEN SUMMED TO OBTAIN AN ESTIMATE OF THE OVERALL CARCINOGENIC RISK POSED.

REFERENCE DOSES (RFDs) HAVE BEEN DEVELOPED BY EPA. RFDs INDICATE THE POTENTIAL FOR ADVERSE HEALTH EFFECTS CAUSED BY EXPOSURE TO CONTAMINANTS EXHIBITING NONCARCINOGENIC EFFECTS. RFDs ARE DERIVED FROM HUMAN EPIDEMIOLOGICAL STUDIES OR ANIMAL STUDIES TO WHICH UNCERTAINTY FACTORS HAVE BEEN APPLIED. THESE UNCERTAINTY FACTORS HELP ENSURE THAT THE RFDs WILL NOT UNDERESTIMATE ADVERSE NONCARCINOGENIC EFFECTS. EPA-ESTABLISHED RFDs FOR INHALATION AND INGESTION EXPOSURES ARE PRESENTED IN TABLE 6.2. THE RFD FOR A GIVEN COMPOUND IS DIVIDED INTO THE ESTIMATED DOSE TO OBTAIN THE HAZARD QUOTIENT (HQ). THE HQs FOR EACH COMPOUND IN A PARTICULAR EXPOSURE PATHWAY ARE THEN SUMMED TO OBTAIN A HAZARD INDEX (HI), WHICH IS THE ESTIMATE OF THE

OVERALL NOD-CARCINOGENIC RISK.

RISK CHARACTERIZATION

THE CANCER RISKS AND NON-CARCINOGENIC RISKS FOR ALL CONTAMINANTS ASSOCIATED WITH ON-SITE WORKER EXPOSURE ARE PRESENTED IN TABLE 6.3. ON-SITE WORKERS ARE SHOWN BECAUSE THEY ARE MOST LIKELY TO BE EXPOSED TO ON-SITE CONTAMINANTS. THE RISKS PRESENTED ARE BASED ON LEVELS OF CONTAMINATION WITH NO REMEDIATION.

THE ACCEPTABLE CARCINOGENIC RISK RANGE IS BETWEEN (10^{-4}) AND (10^{-4}) . THE VALUE SHOWN IN TABLE 6.3 FOR THE REASONABLE MAXIMUM SCENARIO, WHICH IS $2.62 \times (10^{-3})$, EXCEEDS THESE LIMITS. THUS, THESE VALUES POSE AN UNACCEPTABLE RISK. NOTE THAT IN THE EA, LESS-THAN-LIFETIME CANCER RISKS WERE ESTIMATED USING CRUMP AND HOWE'S (1984) METHOD WHICH ADJUSTS EPA SLOPE FACTORS BASED ON EXPOSURE DURATION. INDEPENDENT CALCULATIONS BY EPA REGION VIII INDICATE THAT THERE WAS LITTLE DIFFERENCE BETWEEN THE RESULTS OF CALCULATIONS BASED ON CRUMP AND HOWE ADJUSTMENTS AND THOSE BASED ON STANDARD LIFETIME AVERAGING (LADD) METHODS. THUS, IN SUBSEQUENT RISK CALCULATIONS, LADD CALCULATIONS WERE USED TO ESTIMATE RISKS. IT IS THE LATTER ESTIMATES THAT ARE REPORTED IN TABLE 6.3.

TABLE 6.3 SHOWS THE NON-CARCINOGENIC HAZARD INDEX CALCULATED FOR THE FUTURE ON-SITE WORKER POPULATION, WHICH IS 2.12. AN HI OVER 1.0 INDICATES THAT THERE MAY BE A RISK POSED BY THE EXPOSURE TO NON-CARCINOGENIC COMPOUNDS. BECAUSE THE VALUES FOR THE REASONABLE MAXIMUM SCENARIO EXCEED ONE, THE POTENTIAL FOR HEPATOTOXICITY IN EXPOSED WORKERS EXISTS. EXPOSURE FACTORS ARE THE SAME AS THOSE DESCRIBED FOR CARCINOGENIC RISKS ABOVE.

RISK ESTIMATES FOR SCENARIOS INVOLVING EXPOSURES TO GROUND WATER WERE NOT PROVIDED IN THE EA. HOWEVER, SUBSEQUENT PRELIMINARY EXPOSURE ESTIMATES MADE BY EPA REGION VIII INDICATE THE POTENTIAL FOR HIGH LEVELS OF EXPOSURE TO FUTURE USERS OF GROUND WATER. STANDARD QUANTITATIVE RISK CHARACTERIZATION METHODS SUGGEST THAT CHRONIC EXPOSURES TO CONTAMINATED GROUND WATER COULD RESULT IN UNACCEPTABLE RISKS OF CANCER IN EITHER WORKERS DRINKING FROM CONTAMINATED WELLS OR IN FUTURE RESIDENTS USING THE GROUND WATER FOR DRINKING, BATHING, AND COOKING. SUBSTANTIAL POTENTIAL RISK IS ASSOCIATED WITH EXPOSURES TO TCE AND PCE. A POTENTIAL RISK FROM DIOXINS AND HCB IN GROUND WATER WAS ALSO SUGGESTED IN THIS ASSESSMENT. HOWEVER, THIS RISK WAS BASED ON HIGH DETECTION LIMITS FOR WATER ANALYSES AND THE PRESENCE OF DIOXINS AND HCB ON-SITE. NO ANALYSES OF ON-SITE GROUND WATER DETECTED ANY DIOXIN OR HCB. IN ADDITION, THE POTENTIAL EXPOSURE CONCENTRATION FOR PCP IN GROUND WATER EXCEEDED THE PROPOSED MCL BASED ON THE NEW SLOPE FACTOR FOR INGESTED PCP. THIS SLOPE FACTOR, AS EXPLAINED BELOW, WAS NOT AVAILABLE AT THE TIME THE GROUND WATER ASSESSMENT WAS WRITTEN. THIS ASSESSMENT OF THE GROUND WATER PATHWAY CAN BE FOUND IN THE ADMINISTRATIVE RECORD.

OF ALL THE POPULATIONS AND EXPOSURE ROUTES EVALUATED, WITH THE POSSIBLE EXCEPTION OF ACUTE AND/OR SUBCHRONIC EXPOSURE RISKS, THE FUTURE INGESTION OF CONTAMINATED SOILS BY ON-SITE WORKERS WOULD CONTRIBUTE THE GREATEST RISK. THE FUTURE DIRECT DERMAL CONTACT BY ON-SITE WORKERS WOULD ALSO CONTRIBUTE SIGNIFICANTLY TO RISKS AT THE SITE. IN THIS REGARD, ACUTE EXPOSURE TO CONTAMINANTS, ESPECIALLY CHLORDANE, IN THE PROCESS AND YARD DRAIN SLUDGES WAS EXAMINED BY EPA REGION VIII. ESTIMATED EXPOSURES TO FUTURE WORKERS APPEAR TO BE HIGH ENOUGH THAT ACUTE TOXICITY MIGHT BE EXPECTED EVEN AFTER A SINGLE EXPOSURE EVENT. QUANTITATIVE RISK ESTIMATES WERE NOT MADE IN THE ANALYSIS OF ACUTE RISKS.

THE GREATEST UNCERTAINTY ASSOCIATED WITH THE CHARACTERIZATION OF RISK AT THIS SITE INVOLVES THE ACCURATE EVALUATION OF EXPOSURE TO THE SITE CONTAMINANTS. THESE EXPOSURE FACTORS INCLUDE TIME SPENT ON-SITE, BIOAVAILABILITY, AMOUNT OF SOILS INGESTION, AND DEFINITION OF AN APPROPRIATE FUTURE LAND USE. OVERALL, A CONSERVATIVE APPROACH WAS TAKEN IN ORDER TO INSURE ADEQUATE PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT.

ADDITIONAL TOXICITY INFORMATION

SUBSEQUENT TO THE COMPLETION OF ALL RISK ASSESSMENT WORK, AN ORAL CARCINOGENIC SLOPE FACTOR WAS VERIFIED FOR THE INDICATOR CHEMICAL PCP (NO SLOPE FACTOR WAS AVAILABLE DURING THE TIME THE EA AND SUBSEQUENT CALCULATIONS WERE COMPLETED). THE SLOPE FACTOR IS LARGE ENOUGH (0.12 MG/KG/D-1) TO DOMINATE RISKS FROM PCP EXPOSURE IN MOST SCENARIOS. SINCE THE RI/FS AND ROD DO NOT SET AN ACTION LEVEL FOR PCP, THIS INDICATOR CHEMICAL IS NOT INCLUDED IN THE EVALUATION OF AREAS WHERE REMEDIATION IS NECESSARY. THE HIGHEST CONCENTRATIONS OF PCP, HOWEVER, ARE FOUND IN AREAS WHERE OTHER INDICATOR CHEMICALS ARE ALSO PRESENT. IT IS THEREFORE EXPECTED THAT ANY REMEDIAL ACTIVITY WHICH ADDRESSES THE INDICATOR CHEMICALS CURRENTLY HAVING ACTION LEVELS WILL ALSO REDUCE PCP CONCENTRATIONS TO ACCEPTABLE LEVELS. IN LIGHT OF THE PCP SLOPE FACTOR HAVING BEEN RECENTLY VERIFIED, RESIDUAL PCP CONCENTRATIONS WILL BE ASSESSED DURING REMEDIAL ACTION TO ENSURE NO UNACCEPTABLE RISK DUE TO THIS CONTAMINANT WILL REMAIN AT THE SITE.

ENVIRONMENTAL RISKS

NO CRITICAL WILDLIFE HABITATS, ENDANGERED SPECIES, OR HABITATS OF ENDANGERED SPECIES ARE AFFECTED BY SITE CONTAMINANTS. PESTICIDES, HERBICIDES, AND METALS WERE ANALYZED IN VEGETATION SAMPLES AND TISSUE SAMPLES

TAKEN FROM MICE AND PIGEONS COLLECTED AT THE SITE. NEITHER HERBICIDES NOR PESTICIDES WERE DETECTED IN THE ANIMAL TISSUE SAMPLES. THERE WAS NO EVIDENCE OF ORGAN TISSUE ABNORMALITY IN THE PIGEONS THAT WERE SAMPLED. IN ADDITION, DIOXINS AND TURANS WERE ANALYZED IN AQUATIC AND UPLAND VEGETATION SAMPLES. THE CONTAMINANTS WERE NOT FOUND TO BE IMPACTING BIOTA AT OR NEAR THE SITE.

CONCLUSION

ACTUAL OR THREATENED RELEASES OF HAZARDOUS SUBSTANCES FROM THIS SITE, IF NOT ADDRESSED BY IMPLEMENTING THE RESPONSE ACTION SELECTED IN THIS ROD, MAY PRESENT AN IMMINENT AND SUBSTANTIAL ENDANGERMENT TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT. THE HAZARDOUS NATURE OF THIS SITE IS ILLUSTRATED BY THE VALUES PRESENTED IN TABLE 6.3. UNDER THE REASONABLE MAXIMUM EXPOSURE SCENARIO FOR AN ON-SITE ADULT WORKER, THE OVERALL CARCINOGENIC RISK WAS ESTIMATED TO BE $2.62 \times (10^{-3})$ AND THE NON-CARCINOGENIC HI TO BE 2.12. A CANCER RISK OF $2.62 \times (10^{-3})$ MEANS THAT FOR EVERY 1,000 PERSONS EXPOSED AS A WORKER ON THE SITE, BETWEEN 2 AND 3 (2.62) OF THEM WILL DEVELOP CANCER AS A RESULT OF THAT EXPOSURE. A HI OF 2.12 INDICATES THAT A WORKER AT THE SITE IS BEING EXPOSED TO A LITTLE OVER TWICE THE LEVEL (2.12 TIMES THE LEVEL) THAT THE EPA CONSIDERS SAFE FOR THOSE COMPOUNDS WHICH DO NOT CAUSE CANCER. THESE RISKS ARE FOR POTENTIAL FUTURE USES OF THE SITE, AND NOT RISKS POSED BY CURRENT USE OF THE SITE. REMEDIATION OF THE SITE TO THE CONCENTRATIONS PROPOSED IN THIS ROD WILL RESULT IN RISKS WHICH ARE WITHIN THE ACCEPTABLE RANGE AS ESTABLISHED BY EPA GUIDANCE.

#DA

DESCRIPTION OF ALTERNATIVES

A FEASIBILITY STUDY (FS) WAS CONDUCTED TO DEVELOP AND EVALUATE REMEDIAL ALTERNATIVES FOR SOILS, SLUDGES, DIOXIN REMOVAL WASTES, AND GROUND WATER AT THE WASATCH CHEMICAL SITE. REMEDIAL ALTERNATIVES WERE ASSEMBLED FROM APPLICABLE REMEDIAL TECHNOLOGY PROCESS OPTIONS AND WERE INITIALLY EVALUATED FOR EFFECTIVENESS, IMPLEMENTABILITY, AND COST. THE ALTERNATIVES PASSING THIS SCREENING WERE THEN EVALUATED BASED ON NINE CRITERIA REQUIRED BY THE NCP. IN ADDITION TO REMEDIAL ALTERNATIVES, THE NCP REQUIRES A NO ACTION ALTERNATIVE BE CONSIDERED AT EVERY SITE. THE NO ACTION ALTERNATIVE SERVES PRIMARILY AS A POINT OF COMPARISON FOR OTHER ALTERNATIVES.

FOLLOWING THE DETAILED SCREENING ANALYSIS IN THE FS, FIVE REMEDIAL ALTERNATIVES (INCLUDING THE NO ACTION ALTERNATIVE) REMAINED FOR TREATMENT OF SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES AND FIVE ALTERNATIVES REMAINED FOR TREATMENT OF GROUND WATER. THESE ALTERNATIVES ARE DESCRIBED BELOW WITH THE ORIGINAL ALTERNATIVE NUMBERING SEQUENCE FROM THE FS REPORT AND PROPOSED PLAN. THE REMEDIAL ALTERNATIVES FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES ARE DESCRIBED FIRST, AND GROUND WATER ALTERNATIVES ARE DESCRIBED SECOND IN A SEPARATE SECTION.

REMEDIAL ACTION ALTERNATIVES FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES

ACTION LEVELS WERE DEVELOPED TO PROVIDE REMEDIATION GOALS IN THE ABSENCE OF ANY CHEMICAL-SPECIFIC APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) PROMULGATED FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES. THE POTENTIAL RISKS TO HUMAN HEALTH AND THE ENVIRONMENT IDENTIFIED IN THE RISK ASSESSMENT PROCESS PROVIDE THE BASIS FOR ESTABLISHING THESE ACTION LEVELS WHICH ARE PRESENTED IN TABLE 5.2.

THE ESTIMATED VOLUME OF SITE SOILS AND SLUDGES REQUIRING REMEDIATION WAS CALCULATED USING THE SOILS ACTION LEVELS AND THE SOILS BORING DATA COLLECTED DURING THE RI. THE ESTIMATED TOTAL VOLUME OF SOILS EXCEEDING ACTION LEVELS IS 1189 CUBIC YARDS: 964 CUBIC YARDS OF THE SURFACE SOILS AND 225 CUBIC YARDS OF SOILS SURROUNDING THE PROCESS DRAIN. IN ADDITION, 1,111 CUBIC YARDS OF PETROLEUM HYDROCARBON CONTAMINATED SOILS WILL BE EXCAVATED AND TREATED WITH LANDFARMING TECHNIQUES. THERE ARE AN ADDITIONAL ESTIMATED 15 CUBIC YARDS OF WASTE MATERIAL PILED IN THE FERTILIZER BUILDING, AND 13 CUBIC YARDS OF INVESTIGATION-DERIVED MATERIAL.

SLUDGES ARE PRESENT IN THE PROCESS DRAIN SYSTEM, THE YARD DRAIN SYSTEM, THE LOT 6 SEPTIC TANK/SUMP SYSTEM AND THE FORMER EVAPORATION POND. THE ESTIMATED SLUDGES VOLUME IS 2,370 CUBIC YARDS. THE TOTAL ESTIMATED VOLUME OF SOILS AND SLUDGES TO BE REMEDIATED IS THEREFORE APPROXIMATELY 4,698 CUBIC YARDS. THE RESULTS OF VERIFICATION SAMPLING TO BE CONDUCTED DURING REMEDIAL ACTION MAY AFFECT THE ACTUAL VOLUME TO BE REMEDIATED.

FINALLY, 1 CUBIC YARD OF MISCELLANEOUS CONTAMINATED MATERIAL AND 650 GALLONS OF LIQUID WASTE MATERIAL CONTAINED IN DRUMS IN THE DIOXIN STORAGE AREA WILL ALSO BE REMEDIATED WITH SOILS AND SLUDGES.

ELEMENTS COMMON TO EACH ALTERNATIVE

EACH ALTERNATIVE PRESENTED FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES (INCLUDING THE NO ACTION ALTERNATIVE) ADDRESSES CLEANUP OF THE DIOXIN REMOVAL WASTES CONTAINED IN THE DIOXIN STORAGE FACILITY. EXCLUDING THE NO ACTION ALTERNATIVE, EACH ALTERNATIVE ALSO INCLUDES THE FOLLOWING COMMON ELEMENTS (EXCEPT THAT LANDFARMING IS NOT A PART OF ALTERNATIVE 7):

INSTITUTIONAL CONTROLS - AS AN EXTRA PRECAUTIONARY MEASURE, INSTITUTIONAL CONTROLS SUCH AS DEED RESTRICTIONS, DENIAL OF WELL PERMITS, OR ACQUISITION OF WATER RIGHTS, WILL BE IMPLEMENTED AS PRACTICABLE AND TO THE EXTENT ALLOWABLE BY LAW. INSTITUTIONAL CONTROLS SUCH AS DEED RESTRICTIONS WILL BE USED TO PREVENT THE SITE FROM BEING USED FOR NONINDUSTRIAL PURPOSES AND TO MAINTAIN ACCESS RESTRICTIONS. DIRECT COSTS WILL BE MINIMAL.

LANDFARMING - APPROXIMATELY 1,111 CUBIC YARDS OF PETROLEUM HYDROCARBON CONTAMINATED SOILS WILL BE EXCAVATED AND AERATED TO PROMOTE BIOLOGICAL DEGRADATION AND ENHANCE VOLATILIZATION OF CONTAMINANTS. THE LANDFARMING WILL INVOLVE CONSTRUCTION OF A LANDFARMING CELL ON-SITE, EXCAVATION OF SOILS, AND OPERATION AND MAINTENANCE SUCH AS TILLING AND NUTRIENT APPLICATION. AIR EMISSIONS GENERATED DURING LANDFARMING WOULD BE SUBJECT TO STATE BEST AVAILABLE CONTROL TECHNOLOGY (BACT) REQUIREMENTS, (UNLESS STANDARDS FOR EXEMPTIONS FROM THOSE REQUIREMENTS ARE MET). RELEVANT AND APPROPRIATE REQUIREMENTS FOR RELEASES FROM RCRA SOLID WASTE MANAGEMENT UNITS (SWMUS) WILL BE COMPLIED WITH. RELEVANT AND APPROPRIATE RCRA MINIMUM TECHNOLOGY REQUIREMENTS FOR LAND TREATMENT WILL ALSO BE COMPLIED WITH. THE IMPLEMENTATION TIME IS APPROXIMATELY ONE TO THREE MONTHS AT AN ESTIMATED COST OF \$81,000.

POSSIBLE DEWATERING OF THE FORMER EVAPORATION POND CONTENTS, IF NECESSARY TO FACILITATE TREATMENT OF SOILS, SLUDGES, OR DIOXIN REMOVAL WASTES, AND TREATMENT OF THE RESULTING LIQUIDS.

ADDITIONAL CHARACTERIZATION OF THE FORMER EVAPORATION POND CONTENTS IF ALTERNATE DISPOSAL OF MATERIALS NOT EXCEEDING ACTION LEVELS IS DECIDED UPON DURING REMEDIAL DESIGN.

PAVING OF ALL UNPAVED AREAS AS AN EXTRA PRECAUTIONARY MEASURE.

CLOSURE OF THE RCRA STORAGE FACILITY DURING THE CERCLA ACTION. ALL RCRA CLOSURE REQUIREMENTS WILL BE MET. IT IS INTENDED THAT FORMAL RCRA CLOSURE WILL BE ACCOMPLISHED SIMULTANEOUSLY THROUGH COORDINATION WITH RCRA AUTHORITIES.

THE TYPES OF TREATMENT OPTIONS AVAILABLE FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES WERE LIMITED DUE TO RESTRICTIONS ON THE TREATMENT AND DISPOSAL OF DIOXIN-CONTAMINATED WASTE MATERIAL WHICH CANNOT CURRENTLY BE TREATED OR DISPOSED AT ANY OFF-SITE FACILITY IN THE NATION. AN ASSUMPTION WAS MADE IN THE FS THAT AN OFF-SITE INCINERATOR WOULD EVENTUALLY BE PERMITTED TO ACCEPT DIOXIN REMOVAL WASTES.

MEANWHILE, DIOXIN REMOVAL WASTES WOULD BE STORED ON-SITE. THE REMEDIAL ALTERNATIVES FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES ARE DESCRIBED BELOW AND ARE NUMBERED CONSISTENTLY WITH ALTERNATIVES PRESENTED IN THE FS. ALTERNATIVES 2 (INSTITUTIONAL CONTROLS), 3 (OFF-SITE INCINERATION), AND 6 (ON-SITE INCINERATION) WERE ELIMINATED DURING THE FS SCREENING PROCESS AND ARE THEREFORE NOT PRESENTED HERE.

EACH ALTERNATIVE DESCRIPTION BELOW INCLUDES A BRIEF ANALYSIS OF ARARS. IN ORDER TO CLARIFY THE ARARS ANALYSES, TWO DISTINCTIONS ARE MADE. FIRST, COMPLIANCE WITH ARARS DIFFERS FOR ACTIVITIES CONDUCTED ON-SITE, AS OPPOSED TO ACTIVITIES CONDUCTED OFF-SITE. ON-SITE, EACH ARAR IS DETERMINED TO BE EITHER APPLICABLE (IN WHICH CASE ALL OF ITS REQUIREMENTS ARE TO BE COMPLIED WITH), OR RELEVANT AND APPROPRIATE (IN WHICH CASE ONLY THOSE REQUIREMENTS DEEMED APPROPRIATE ARE TO BE COMPLIED WITH). THIS DISTINCTION, HOWEVER, IS NOT MADE FOR OFF-SITE ACTIVITIES, FOR WHICH REQUIREMENTS ARE EITHER APPLICABLE OR NOT. OFF-SITE ACTIVITIES CONTEMPLATED UNDER EACH ALTERNATIVE WILL NEED TO COMPLY WITH THE REVISED PROCEDURES FOR IMPLEMENTING OFF-SITE RESPONSE ACTIONS, OSWER DIRECTIVE 98341 1, DATED NOVEMBER 13, 1987 (THE OFF-SITE POLICY). THIS ROD PROVIDES THAT FOR CERTAIN OFF-SITE ACTIVITIES, REQUIREMENTS WHICH ARE NOT APPLICABLE WILL BE COMPLIED WITH IN THE INTEREST OF ASSURING PROTECTIVENESS TO HUMAN HEALTH AND THE ENVIRONMENT. THESE INSTANCES ARE NOTED IN THE TEXT.

SECOND, AND MORE SPECIFICALLY, PORTIONS OF RCRA HAVE BEEN DETERMINED TO BE RELEVANT AND APPROPRIATE, BUT NOT APPLICABLE, FOR ON-SITE ACTIVITIES. RCRA IS APPLICABLE TO LISTED OR CHARACTERISTIC WASTES. IN ORDER TO BE LISTED, IT IS NECESSARY TO KNOW THE ORIGIN OF A WASTE. HOWEVER, BECAUSE DOCUMENTATION REGARDING THE ORIGIN OF WASTES IS NOT AVAILABLE, IT MUST BE ASSUMED THAT THE WASTES ARE NOT RCRA LISTED WASTES. FURTHERMORE, NO WASTE MATERIAL AT THE SITE HAS BEEN VERIFIED TO BE RCRA CHARACTERISTIC. IT IS ASSUMED IN THIS ROD THAT NO RCRA CHARACTERISTIC WASTES ARE PRESENT AT THE SITE. THE ABSENCE OR PRESENCE OF RCRA CHARACTERISTIC WASTES WILL BE REEXAMINED DURING REMEDIAL DESIGN. IF IT IS DETERMINED DURING REMEDIAL DESIGN THAT THE SITE DOES CONTAIN CHARACTERISTIC WASTES, THE REMEDY WILL BE ADJUSTED ACCORDINGLY.

THUS, RCRA HAS BEEN DETERMINED TO BE NOT APPLICABLE TO THE ON-SITE ACTIVITIES. FOR THE SAME REASONS, RCRA WOULD NOT BE EXPECTED TO APPLY TO OFF-SITE ACTIVITIES. HOWEVER, CONTAMINATED MATERIAL FOUND AT THE SITE IS SUFFICIENTLY SIMILAR TO RCRA WASTES SUCH THAT RCRA REQUIREMENTS HAVE BEEN EVALUATED TO DETERMINE WHETHER THEY ARE RELEVANT AND APPROPRIATE BASED UPON THE CIRCUMSTANCES OF THE RELEASES, NATURE OF THE HAZARDOUS MATERIALS, SITE CHARACTERISTICS, AND NATURE OF THE REQUIREMENTS. IN MANY INSTANCES, THE SIMILARITY BETWEEN WASTE MATERIAL FOUND ON-SITE AND RCRA WASTES, AND THE SIMILARITY BETWEEN ACTIONS CONTEMPLATED AND ACTIVITIES REGULATED UNDER RCRA, MAKES CERTAIN RCRA REQUIREMENTS RELEVANT AND APPROPRIATE

ALTERNATIVE NO. 1 NO ACTION

THE NO ACTION ALTERNATIVE MUST BE EVALUATED FOR BASELINE COMPARISON AS PART OF THE FEASIBILITY STUDY PROCESS. UNDER THE NO ACTION ALTERNATIVE, REMEDIATION GOALS WOULD NOT BE MET BECAUSE NO REMEDIAL ACTION WOULD BE UNDERTAKEN TO TREAT, CONTAIN, OR REMOVE SOILS AND SLUDGES WITH CONTAMINANTS EXCEEDING ACTION LEVELS. NO REDUCTION OF TOXICITY, MOBILITY, OR VOLUME ASSOCIATED WITH SITE SOILS OR SLUDGES WOULD OCCUR. HOWEVER, DIOXIN REMOVAL WASTES WOULD BE INCINERATED AT AN OFF-SITE INCINERATION FACILITY AS MANDATED BY PAST REMOVAL ACTIVITIES (ADMINISTRATIVE ORDER ON CONSENT, IN THE MATTER OF WASATCH LOT 6, DOCKET NO. CERCLA VIII-86-04). AN INCINERATION FACILITY PERMITTED TO ACCEPT AND INCINERATE DIOXINS FROM THIS SITE WOULD HAVE TO BE IDENTIFIED. NO SUCH FACILITY IS CURRENTLY KNOWN TO EXIST.

INCINERATION INVOLVES THE CONTROLLED COMBUSTION OF ORGANIC MATERIAL UNDER CONDITIONS IN WHICH THE OXYGEN CONTENT IN THE INCINERATOR CHAMBER (FURNACE) IS GREATER THAN ZERO. SEVERAL TYPES OF INCINERATION PROCESSES ARE AVAILABLE. INCINERATION PROCESSES, IN GENERAL, ACHIEVE ORGANICS DESTRUCTION THROUGH THE PROPER COMBINATION OF RETENTION TIME, TURBULENCE, AND TEMPERATURE.

AS NOTED ABOVE, RCLRA WOULD NOT BE APPLICABLE TO OFF-SITE INCINERATION. HOWEVER, THE DIOXIN REMOVAL WASTES WHICH WOULD UNDERGO INCINERATION ARE SIMILAR TO RCLRA WASTES, AND THE RESULTING INCINERATED MATERIAL WOULD UNDERGO PLACEMENT DURING ITS DISPOSAL. IN ORDER TO ENSURE THE PROTECTIVENESS AFFORDED BY RCRA, THE INCINERATION OF DIOXIN REMOVAL WASTES AND THE SUBSEQUENT DISPOSAL OF THE RESULTING ASH MATERIAL WOULD COMPLY WITH RCRA LDRS. DISPOSAL OF ASH WOULD COMPLY WITH THE OFF-SITE POLICY. DURING IMPLEMENTATION OF THIS PORTION OF THE ALTERNATIVE, ON-SITE ACTIVITIES WOULD COMPLY WITH OSHA HEALTH AND SAFETY REQUIREMENTS. RCA REQUIREMENTS PERTAINING TO PRE-TRANSPORTATION AND TRANSPORTATION OFF-SITE OF THE DIOXIN REMOVAL WASTES FOR INCINERATION ALSO WOULD BE MET. OFF-SITE INCINERATION IS A COMPONENT OF ALL ALTERNATIVES EXCEPT ALTERNATIVE 4.

THE 30-YEAR PRESENT WORTH FOR ALTERNATIVE 1 IS \$24,000. THIS INCLUDES ESTIMATED COSTS FOR TRANSPORTATION AND INCINERATION OF DIOXIN REMOVAL WASTES. THE TIME REQUIRED TO IMPLEMENT THIS ALTERNATIVE WOULD BE DEPENDENT ON THE AVAILABILITY OF AN INCINERATOR FOR DIOXIN REMOVAL WASTES.

ALTERNATIVE NO. 4 - IN-SITU VITRIFICATION

THIS ALTERNATIVE INVOLVES STAGING SOILS EXCEEDING ACTION LEVELS, SLUDGES, AND DIOXIN REMOVAL WASTES IN THE FORMER EVAPORATION POND AND TREATING THE STAGED MATERIALS USING AN IN-SITU VITRIFICATION (ISV) PROCESS. -I-HIS IS THE ALTERNATIVE PREFERRED BY EPA AND UDOH.

ISV IS A THERMAL PROCESS WHICH CONVERTS CONTAMINATED MATERIALS INTO CHEMICALLY INERT, STABLE GLASS AND CRYSTALLINE MATERIALS. FIELD APPLICATION REQUIRES THE INSERTION OF LARGE ELECTRODES INTO CONTAMINATED MATERIALS CONTAINING SIGNIFICANT LEVELS OF SILICATE MATERIAL AND THE GENERATION OF HEAT BY PASSING ELECTRIC CURRENT THROUGH THE ELECTRODES. AT THE HIGH TEMPERATURES PRODUCED BY ISV, ANY SOILS OR ROCK COMPONENTS OF THE STAGED MATERIAL WILL MELT, ORGANIC COMPOUNDS WILL BE DESTROYED, AND MANY METALLIC MATERIALS WILL EITHER FUSE OR VAPORIZE. ANY GASES AND VAPORS PRODUCED ARE COLLECTED BY PLACING A HOOD ABOVE THE AFFECTED AREA AND ARE SUBSEQUENTLY TREATED.

THE ADVANTAGES OF ISV INCLUDE REDUCING THE TOXICITY, MOBILITY, AND VOLUME OF CONTAMINANTS THROUGHOUT TREATMENT, AND PRODUCING A HIGHLY DURABLE PRODUCT WITH AN EXTREMELY LOW LEACH RATE. THE DISADVANTAGES INCLUDE SPECIAL EQUIPMENT REQUIREMENTS AND PERSONNEL GAINING, THE POTENTIAL FOR SOILS MOISTURE TO INCREASE OPERATION TIME AND PROCESS COST, AND THE TECHNOLOGY'S POTENTIAL TO CAUSE VAPORIZED CONTAMINANTS TO MIGRATE AWAY FROM THE TREATMENT AREA INSTEAD OF TO THE SURFACE FOR COLLECTION AND TREATMENT.

A TREATABILITY TEST ON A REPRESENTATIVE SAMPLE OF SOILS AND SLUDGES FROM THE SITE WAS PERFORMED. THE ISV PROCESS, APPLIED TO SITE SOILS, RESULTED IN SIGNIFICANT REDUCTION IN TOXICITY, MOBILITY, AND VOLUME THROUGH THE DESTRUCTION AND VITRIFICATION OF CONTAMINANTS. THE OVERALL DRE FOR THE ISV PROCESS WAS DETERMINED TO BE IN THE RANGE OF 99.997 TO 99.99995 PERCENT FOR THE ORGANIC COMPOUNDS OF CONCERN, WHICH MEETS THE SOILS ACTION LEVELS AT THE SITE. HOWEVER, THE RESULTS ALSO INDICATE INCREASED CONCENTRATIONS OF DIOXINS AND FURANS IN CLEAN SOILS SURROUNDING THE MELT ZONE. THE QUANTITIES OF DIOXINS AND FURANS FOUND AROUND THE MELT ZONE ARE SUSPECTED TO HAVE BEEN CREATED BY MOVEMENT OF MOISTURE, PARTIALLY SATURATED WITH PCP, INTO PRETEST SOILS SURROUNDING THE CONTAMINATED ZONE, FOLLOWED BY A THERMALLY-INDUCED REACTION OF PCP TO DIOXINS DURING ISV PROCESSING. SUCH DIOXIN FORMATION, IF ATTRIBUTED TO MINOR CAPILLARY MOISTURE MOVEMENT, WOULD NOT PRESENT A CONCERN DURING FULL-SCALE OPERATIONS BECAUSE CLEAN SOILS ADJACENT TO CONTAMINATED MATERIALS WILL BE VITRIFIED IN SUBSEQUENT ISV SETTINGS.

THE PRIMARY CONCERN WITH THE IMPLEMENTATION OF ISV IS THE PHENOMENON OF VAPOR RETREAT. THE POSSIBILITY EXISTS FOR VAPORIZATION, MIGRATION, AND CONDENSATION OF ORGANIC COMPOUNDS AWAY FROM THE ISV MELT ZONE. THIS WOULD RESULT IN INCREASED CONCENTRATIONS AND MOBILITY OF CONTAMINANTS DURING AND AFTER ISV PROCESSING. CURRENTLY, THERE ARE NOT ENOUGH DATA AVAILABLE TO CONCLUSIVELY RESOLVE THIS CONCERN, ALTHOUGH PRELIMINARY

RESULTS FROM OTHER STUDIES SUGGEST THAT CONTAMINANTS WERE DESTROYED BY ISV AND DID NOT MIGRATE INTO SURROUNDING, CLEANER SOILS. HOWEVER, CONTAMINANT FATE AND TRANSPORT ARE CHEMICAL- AND SITE-SPECIFIC PROCESSES WHICH WILL DIFFER AT THE WASATCH CHEMICAL SITE. SITE-SPECIFIC CONDITIONS, AND THE PHENOMENON OF VAPOR RETREAT, WILL BE EXAMINED WITH A SECOND TREATABILITY STUDY DURING REMEDIAL DESIGN (RD).

DURING IMPLEMENTATION OF ISV, SOILS AND SLUDGES EXCEEDING ACTION LEVELS WILL BE EXCAVATED AND STAGED IN OR OVER THE FORMER EVAPORATION POND. DIOXIN REMOVAL WASTES WILL ALSO BE PLACED IN THE POND. LIQUID DIOXIN REMOVAL WASTES WILL BE SOLIDIFIED OR OTHERWISE IMMOBILIZED PRIOR TO PLACEMENT. A BERM OF CLEAN SOILS WILL BE BUILT AROUND THE MATERIAL IN THE FORMER EVAPORATION POND PRIOR TO TREATMENT.

AS NOTED EARLIER, RCRA CONTAINS NUMEROUS ACTION-SPECIFIC REQUIREMENTS WHICH ARE NOT APPLICABLE, BUT ARE RELEVANT AND APPROPRIATE. RCRA LDRS ARE IMPORTANT TO ALTERNATIVE 4 BECAUSE OF ACTIVITIES INVOLVING PLACEMENT OF THE DIOXIN REMOVAL WASTES. SINCE CONTAMINATION WITHIN THE SITE BOUNDARIES IS RELATIVELY CONTIGUOUS, THE ENTIRE SITE IS CONSIDERED AN AREA OF CONTAMINATION (AOC). CONSOLIDATION OF WASTE MATERIAL IN THE FORMER EVAPORATION POND WITHIN THE AOC IS, BY DEFINITION, NOT PLACEMENT. HOWEVER, MOVEMENT OF THE DIOXIN REMOVAL WASTES TO THE FORMER EVAPORATION POND PRIOR TO TREATMENT IS RESTRICTED BECAUSE THESE WASTE MATERIALS, WHICH CONTAIN INDICATOR CHEMICALS AT LEVELS EXCEEDING LDR TREATMENT STANDARDS, ARE IN A DISCRETE AREA AND SO ARE NOT INCLUDED IN THE AOC. AN INTERIM MEASURE WAIVER (IMW) TO ALLOW THE TEMPORARY PLACEMENT OF THE RESTRICTED HAZARDOUS MATERIALS FROM OUTSIDE THE AOC INTO THE FORMER EVAPORATION POND WITHOUT PRETREATMENT, PRIOR TO REMEDIATION BY MEANS OF IN-SITU VITRIFICATION, IS THEREFORE NECESSARY. DETAILS OF THE IMW ARE DESCRIBED FURTHER IN SECTION 10 (STATUTORY DETERMINATIONS). THIS ALTERNATIVE WOULD BE IN FULL COMPLIANCE WITH THE LDR TREATMENT STANDARDS LISTED IN TABLE 7.1 UPON COMPLETION OF THE REMEDIAL ACTION. THE INTERIM MEASURE, I.E. CONSOLIDATION, WOULD BE CONDUCTED SO AS NOT TO DIRECTLY CAUSE MIGRATION OF CONTAMINANTS, COMPLICATE THE REMEDIAL ACTION, OR PRESENT ANY IMMEDIATE THREAT TO HUMAN HEALTH OR THE ENVIRONMENT. FURTHERMORE, THE INTERIM MEASURE WOULD NOT INTERFERE WITH, PRECLUDE, OR DELAY THE FINAL REMEDIAL ACTION.

AN EQUIVALENT METHOD PETITION FOR TREATMENT WITH ISV WILL NOT BE NECESSARY BECAUSE LDRS PRESCRIBE TREATMENT CONCENTRATIONS, NOT TREATMENT TECHNOLOGIES, FOR THOSE RCRA WASTES TO WHICH SITE CONTAMINANTS ARE SIMILAR.

CERTAIN RCRA MINIMUM TECHNOLOGY REQUIREMENTS ARE RELEVANT AND APPROPRIATE TO THE EXTENT THAT MIGRATION OF CONTAMINANTS CONSOLIDATED IN THE FORMER EVAPORATION POND MUST BE PREVENTED.

APPROPRIATE MEASURES WILL BE TAKEN UNDER THIS ALTERNATIVE TO ENSURE MIGRATION DOES NOT OCCUR DURING IMPLEMENTATION OF THE REMEDY.

ANY OFF-SITE DISPOSAL OR TREATMENT OF FILTERS USED IN THE OFF-GAS TREATMENT OR OF OTHER CONTAMINATED MATERIALS WILL COMPLY WITH THE OFF-SITE POLICY. THIS ALTERNATIVE IS NOT EXPECTED TO GENERATE EMISSIONS OF AIR CONTAMINANTS AND WILL FULLY COMPLY WITH FEDERAL AND STATE AIR QUALITY REGULATIONS SUCH AS THE CLEAN AIR ACT PRIMARY AND SECONDARY AIR QUALITY STANDARDS AND THE UTAH AIR CONSERVATION REGULATIONS. AIR MONITORING WILL BE PERFORMED DURING THE REMEDIATION.

SHOULD DE-WATERING OF THE FORMER EVAPORATION POND CONTENTS BE NECESSARY, THE RESULTING WATER WOULD BE TREATED WITH CHARCOAL FILTRATION, AND DISCHARGED SIMILARLY AS TREATED GROUND WATER, AS DESCRIBED BELOW.

THE 30-YEAR PRESENT WORTH OF ALTERNATIVE 4 IS \$3,300,000. THE ESTIMATED IMPLEMENTATION TIME IS SIX MONTHS.

ALTERNATIVE NO. 5- GLYCOLATE DECHLORINATION AND OFF-SITE INCINERATION OF DIOXIN REMOVAL WASTES

THIS ALTERNATIVE REDUCES TOXICITY AND MOBILITY, AND PERMANENTLY TREATS THE SITE MATERIALS TO PROVIDE LONG-TERM, PERMANENT PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. UNDER THIS REMEDIAL ACTION ALTERNATIVE, SOILS EXCEEDING ACTION LEVELS, SLUDGES, AND DIOXIN REMOVAL WASTES WOULD BE TREATED ON-SITE BY GLYCOLATE DECHLORINATION (ALKALINE POLYETHYLENE GLYCOLATE, OR APEG PROCESS). APEG IS AN INNOVATIVE TECHNOLOGY CAPABLE OF ACHIEVING HIGH DRES FOR CHLORINATED ORGANICS. THE REACTION REPLACES A CHLORINE ATOM ON THE TARGET MOLECULE, FORMING A POLYETHYLENE GLYCOL ETHER WHICH MAY UNDERGO FURTHER DECHLORINATION REACTIONS. THE REPLACEMENT OF A SINGLE CHLORINE ON A DIOXIN MOLECULE PRODUCES A NONHAZARDOUS COMPOUND. LIMITED PILOT-SCALE DATA ON PCBS, DIOXIN, AND DIBENZOFURAN TREATMENT WITH THE APEG PROCESS INDICATE THAT IMPLEMENTATION OF THE PROCESS AT THE SITE MAY BE TECHNICALLY FEASIBLE. A TREATABILITY STUDY DEMONSTRATED THE PROCESS TO BE EFFECTIVE IN REDUCING THE TOXICITY, MOBILITY, AND VOLUME OF CONTAMINANTS IN SOILS AND SLUDGES AT THE SITE. ACTION LEVELS FOR ALL INDICATOR CHEMICALS WERE ATTAINED IN THE TREATED SOILS AND SLUDGES WITH THE POSSIBLE EXCEPTION OF HERBICIDES FOR WHICH NO ACTION LEVELS HAVE BEEN ESTABLISHED (SEE TABLE 5.2 FOR AN EXPLANATION). THE EFFECTIVENESS OF THE APEG PROCESS IN TREATING HERBICIDES IS NOT CLEAR AS ALL ANALYTICAL RESULTS OF HERBICIDES IN TREATED AND UNTREATED SOILS WERE BELOW DETECTION LIMITS. THE DRE FOR DIOXINS WAS DETERMINED TO BE 99.96 PERCENT.

TO IMPLEMENT THE APEG PROCESS, SOILS AND SLUDGES WOULD BE EXCAVATED OR REMOVED, TREATED IN AN ON-SITE REACTOR SYSTEM, AND RETURNED TO THEIR ORIGINAL PLACE. ALTHOUGH THE SITE IS ONE AOC, PLACEMENT UNDER RCRA LDRS WOULD

OCCUR BECAUSE THE WASTE MATERIAL, WHICH IS SIMILAR TO RCRA WASTE, WOULD BE PLACED BACK ONTO THE SITE AFTER TREATMENT. HOWEVER, SINCE THE EFFECTIVENESS OF APEG IN ATTAINING SOME-TREATMENT STANDARDS IS QUESTIONABLE, A SOILS AND DEBRIS TREATABILITY VARIANCE MIGHT BE NECESSARY FOR THIS ALTERNATIVE.

THE APEG PROCESS, AND PARTICULARLY THE OFF-GAS TREATMENT SYSTEM, IS NOT EXPECTED TO GENERATE EMISSIONS OF AIR CONTAMINANTS AND WOULD FULLY COMPLY WITH FEDERAL AND STATE AIR QUALITY REGULATIONS SUCH AS THE CLEAN AIR ACT PRIMARY AND SECONDARY AMBIENT AIR QUALITY STANDARDS AND UTAH AIR CONSERVATION REGULATIONS.

DIOXIN REMOVAL WASTES WOULD FIRST BE TREATED ON-SITE. FOLLOWING DESTRUCTION OF DIOXINS BY THE APEG PROCESS, THE DIOXIN REMOVAL WASTES WOULD BE INCINERATED AT AN OFF-SITE INCINERATION FACILITY TO DESTROY ANY HIGH LEVELS OF HERBICIDES PRESENT IN THE RESIDUALS AND WOULD FULLY MEET LDR STANDARDS AS DESCRIBED UNDER ALTERNATIVE 1.

THE 30-YEAR PRESENT WORTH FOR ALTERNATIVE 5 IS \$4,100,000. THE ESTIMATED IMPLEMENTATION TIME IS SIX MONTHS.

ALTERNATIVE NO. 7 - CAPPING AND OFF-SITE INCINERATION OF DIOXIN REMOVAL WASTES

THIS REMEDIAL ACTION ALTERNATIVE WOULD CONSIST OF PAVING ALL UNPAVED AREAS OF THE SITE (ASPHALT PAVEMENT WAS ASSUMED FOR COST ESTIMATES), AND INCINERATING DIOXIN REMOVAL WASTES AT AN OFF-SITE INCINERATION FACILITY AS DESCRIBED IN ALTERNATIVE J. A CAP WOULD PROVIDE A LOW-PERMEABILITY COVER OVER THE CONTAMINATED AREA TO PREVENT HUMAN/ANIMAL CONTACT WITH SOILS, MINIMIZE AIRBORNE CONTAMINATION, AND MINIMIZE INFILTRATION OF PRECIPITATION, WHICH MAY CONTRIBUTE TO CONTAMINANT MIGRATION. CONSTRUCTION OF THE CAP WOULD BE PERFORMED USING CONVENTIONAL CONSTRUCTION METHODS.

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT IS PROVIDED UNDER THIS ALTERNATIVE. THE CAP WOULD REDUCE THE RISK ASSOCIATED WITH SOILS AND SLUDGES THROUGH ELIMINATION OF EXPOSURE PATHWAYS. THE ALTERNATIVE AS PROPOSED, DOES NOT CONTEMPLATE ANY ACTIVITIES THAT WOULD TRIGGER RCRA LDRS. HOWEVER, DEPENDING ON THE TYPE OF CAP, THE LANDFILL REQUIREMENTS UNDER RCA MIGHT BE RELEVANT AND APPROPRIATE.

OFF-SITE INCINERATION, INCLUDED IN THIS ALTERNATIVE, WOULD BE CARRIED OUT AS DESCRIBED UNDER ALTERNATIVE 1.

THE 30-YEAR PRESENT WORTH FOR ALTERNATIVE 7 IS 660,000. THE TIME TO IMPLEMENT THIS ALTERNATIVE IS ONE MONTH, EXCLUDING INCINERATION OF DIOXIN REMOVAL WASTES.

ALTERNATIVE NO. 8 OFF-SITE DISPOSAL AND OFF-SITE INCINERATION OF DIOXIN REMOVAL WASTES

UNDER THIS REMEDIAL ACTION ALTERNATIVE, BOTH SOILS EXCEEDING ACTION LEVELS AND SLUDGES WOULD BE DISPOSED OF AT AN OFF-SITE DISPOSAL FACILITY. THE DIOXIN REMOVAL WASTES WOULD BE INCINERATED AT AN OFF-SITE INCINERATION FACILITY AS DESCRIBED FOR ALTERNATIVE 1. BECAUSE SOILS EXCEEDING SOILS ACTION LEVELS, SLUDGES, AND DIOXIN REMOVAL WASTES WOULD BE REMOVED FROM THE SITE, THE OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT AT THE SITE WOULD BE MET BY THIS ALTERNATIVE.

OFF-SITE DISPOSAL INVOLVES EXCAVATION OF MATERIALS THAT EXCEED ACTION LEVELS AND TRANSPORT OF THESE MATERIALS TO A LANDFILL THAT IS LICENSED TO ACCEPT HAZARDOUS WASTE MATERIALS UNDER RCRA SUBTITLE C. REQUIREMENTS OF THE OFF-SITE POLICY WOULD BE MET. THERE IS A RCRA-PERMITTED DISPOSAL FACILITY IN UTAH THAT MAY ACCEPT HAZARDOUS MATERIALS. HOWEVER, IT IS POSSIBLE THAT NO FACILITY COULD BE IDENTIFIED THAT WOULD ACCEPT THE DIOXIN CONTAMINATED WASTE. IN FACT, NO SUCH FACILITY HAS BEEN IDENTIFIED TO DATE. ALTERNATIVELY, EXCAVATION OF SOILS AND DEBRIS CONTAINING DIOXIN MAY REQUIRE TEMPORARY STORAGE ON THE SITE, PENDING DEVELOPMENT OF AN ADEQUATE DISPOSAL TECHNOLOGY.

RCRA REQUIREMENTS PERTAINING TO PRE-TRANSPORTATION AND TRANSPORTATION OFF-SITE OF CONTAMINATED MATERIAL FOR DISPOSAL WOULD BE MET TO ENSURE PROTECTIVENESS DURING THAT PHASE OF THE REMEDY.

THE 30-YEAR PRESENT WORTH FOR ALTERNATIVE 8 IS \$1,700,000. THE TIME TO IMPLEMENT THIS ALTERNATIVE IS TWO TO FOUR MONTHS, EXCLUDING INCINERATION OF DIOXIN REMOVAL WASTES.

GROUND WATER REMEDIAL ACTION

THE ACTION LEVELS FOR GROUND WATER ARE THE NATIONAL PRIMARY DRINKING WATER STANDARDS, OR MCLS AND PROPOSED MCLS, SET BY EPA. THESE STANDARDS ARE ALSO USED FOR STATE DRINKING WATER STANDARDS. THE GROUND WATER ALTERNATIVES DESCRIBED BELOW ARE DESIGNED TO MEET THESE STANDARDS. THE ACTION LEVELS FOR INDICATOR CHEMICALS PRESENT IN GROUND WATER AT THE SITE ARE SHOWN IN TABLE 5.4. ATTAINMENT OF THESE LEVELS WILL BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT.

FOR ESTIMATING THE SIZE AND COST OF GROUND WATER REMEDIATION COMPONENTS, IT WAS ASSUMED THAT THE VOLUME OF GROUND WATER TO BE REMEDIATED IS APPROXIMATELY 20.4 MILLION GALLONS, WHICH INCLUDES THE SHALLOW GROUND WATER

BENEATH THE WASATCH CHEMICAL PROPERTY AND BENEATH THE SOUTHERN PORTION OF THE STEELCO PROPERTY. PRELIMINARY DATA SUGGEST THAT THE DEEPER PORTIONS OF THE AQUIFER ARE NOT PRESENTLY CONTAMINATED. AS DESCRIBED IN OTHER PARTS OF THIS ROD, THE GROUND WATER REMEDIAL ALTERNATIVES PRESENTED HERE DO NOT ADDRESS CONTAMINATED GROUND WATER UNDERLYING THE NORTHERN PORTION OF THE STEELCO PROPERTY.

EACH OF THE FOLLOWING GROUND WATER REMEDIAL ALTERNATIVES, EXCEPT THE NO ACTION ALTERNATIVE, INCLUDES, AS PRACTICABLE AND TO THE EXTENT ALLOWABLE BY LAW, AND AS AN EXTRA PRECAUTIONARY MEASURE, INSTITUTIONAL CONTROLS SUCH AS DEED RESTRICTIONS ON THE USE OF GROUND WATER, THE DENIAL OF WELL PERMITS, AND THE ACQUISITION OF WATER RIGHTS. EXCEPT FOR THE NO ACTION ALTERNATIVE, EACH ALTERNATIVE ALSO ASSUMES GROUND WATER CONTAMINATION SOURCES HAVE BEEN CONTROLLED BY REDUCTION OF TOXICITY, MOBILITY, AND VOLUME OF CONTAMINANT SOURCES IN SOILS AND SLUDGES. ADDITIONALLY, PERIODIC GROUND WATER MONITORING SHALL TAKE PLACE IN CONJUNCTION WITH GROUND WATER REMEDIATION. THE MONITORING PROGRAM SHALL BE DEVELOPED DURING RD, AND SHALL BE DESIGNED TO MONITOR THE EFFECTIVENESS OF THE REMEDIAL ACTION AND THE LONG-TERM MAINTENANCE OF GROUND WATER ACTION LEVELS.

THREE GENERAL GROUND WATER ALTERNATIVES WERE EVALUATED IN THE FEASIBILITY STUDY, INCLUDING THE NO ACTION ALTERNATIVE. HOWEVER, SINCE THE TWO ALTERNATIVES REQUIRING ACTION ARE EACH FURTHER SUBDIVIDED BASED ON TWO TREATMENT OPTIONS, A TOTAL OF FIVE ALTERNATIVES ARE DISCUSSED. THE REMEDIAL ALTERNATIVES FOR GROUND WATER, AND THEIR COMPONENT TECHNOLOGIES, ARE DESCRIBED BELOW. THE PRIMARY CHARACTERISTICS OF THE ALTERNATIVES ARE DESCRIBED FIRST AND THE TREATMENT OPTIONS FOR EACH ALTERNATIVE ARE DESCRIBED SEPARATELY.

NO ACTION (ALTERNATIVE GM-I)

THE NO ACTION ALTERNATIVE PROVIDES A BASELINE AGAINST WHICH OTHER ALTERNATIVES CAN BE COMPARED. NO ACTION WOULD RESULT IN LEAVING AFFECTED GROUND WATER IN THE AQUIFER. NO CONSTRUCTION OR OPERATION OF REMEDIAL MEASURES WOULD BE REQUIRED.

THE NO ACTION ALTERNATIVE WOULD NOT MEET THE REMEDIATION GOALS FOR THE SITE. THE SITE WOULD REMAIN AT ITS EXISTING LEVEL OF RISK. THERE WOULD BE NO REDUCTION IN TOXICITY OR MOBILITY OF CONTAMINANTS.

BECAUSE THIS ALTERNATIVE WOULD RESULT IN CONTAMINANTS REMAINING IN THE GROUND WATER, CERCLA WOULD REQUIRE THAT THE SITE BE REVIEWED EVERY FIVE YEARS. THE 30-YEAR PRESENT WORTH FOR ALTERNATIVE GW-1 IS \$130,000. THE TIME TO IMPLEMENT THIS ALTERNATIVE IS INDEFINITE AS CONTINUAL MONITORING WOULD BE REQUIRED.

GROUND WATER COLLECTION AND TREATMENT WITH OPTIONAL CONTAINMENT (ALTERNATIVES NO. GW-2A AND G\V-2B)

THE PRINCIPAL OBJECTIVE OF THESE ALTERNATIVES IS GROUND WATER RESTORATION. THESE ALTERNATIVES INVOLVE THE COLLECTION OF GROUND WATER, TREATMENT, IF NECESSARY TO MEET POTW (PUBLICLY-OWNED TREATMENT WORKS, OR CITY SEWER SYSTEM) OR UPDES (UTAH POLLUTION DISCHARGE ELIMINATION SYSTEM) REQUIREMENTS, AND SUBSEQUENT DISCHARGE OF THE EXTRACTED GROUND WATER. TREATMENT WOULD BE EITHER (1) AIR STRIPPING, OR (2) ADVANCED OXIDATION PROCESSES (AOP). TREATMENT WOULD REDUCE CONTAMINANT LEVELS TO STANDARDS WHICH ALLOW FOR DISCHARGE TO THE POTW OR, UNDER UPDES, TO THE 700 WEST DITCH.

CONTAMINATED GROUND WATER WOULD BE COLLECTED USING A SERIES OF WELLS (WELL FIELD) AND/OR SUBSURFACE DRAINS PLACED TO CAPTURE PLUMES OF AFFECTED GROUND WATER. A WELL-FIELD SIMULATION WAS CONDUCTED TO PROVIDE A PRELIMINARY EVALUATION OF THE NUMBER AND CONFIGURATION OF GROUND WATER EXTRACTION WELLS NEEDED TO MAINTAIN CAPTURE OF AFFECTED GROUND WATER. PRELIMINARY DESIGNS FOR THE WELL FIELD COLLECTION SYSTEM INDICATE THAT 10 WELLS LOCATED AT 100-FOOT INTERVALS ALONG THE NORTHERN AND WESTERN BOUNDARIES OF THE SITE, EXTRACTING GROUND WATER AT A RATE OF 2 GALLONS PER MINUTE (GPM), IS OPTIMAL FOR CAPTURE OF CONTAMINATED GROUND WATER. GROUND WATER COLLECTION WOULD CONTINUE UNTIL PERFORMANCE STANDARDS WERE ATTAINED.

AN OPTIONAL CONTAINMENT STRUCTURE, SUCH AS A SLURRY WALL, MAY BE ADDED TO THESE ALTERNATIVES DURING THE REMEDIAL DESIGN/REMEDIAL ACTION (RD/RA) PHASES IF IT IS DETERMINED THAT A CONTAINMENT OR PARTIAL CONTAINMENT STRUCTURE WOULD ENHANCE THE EFFICIENCY OF FLUSHING AND CAPTURE OF THE GROUND WATER OR IF IT BECOMES CLEAR DURING THE DESIGN OR IMPLEMENTATION PHASES THAT GROUND WATER MUST BE PHYSICALLY CONTAINED TO PREVENT FURTHER MIGRATION OF CONTAMINANTS.

GROUND WATER COLLECTION. OPTIONAL CONTAINMENT. AND TREATMENT WITH AIR STRIPPING (ALTERNATIVE GW-2A)

UNDER ALTERNATIVE GW-2A, EXTRACTED GROUND WATER WOULD BE TREATED, IF IT DOES NOT MEET POTW OR UPDES STANDARDS, WITH AN AIR STRIPPER. AIR STRIPPING IS A GAS TRANSFER PROCESS IN WHICH A LIQUID CONTAINING VOLATILE SOLUTES IS BROUGHT INTO CONTACT WITH AIR AND AN EXCHANGE OF GASES OCCURS BETWEEN THE AIR AND WATER CONTAINING THE VOLATILE CONTAMINANTS. THE PROCESS IS EFFECTIVE FOR REMOVAL OF VOCs FROM WATER. AIR STRIPPING IS MOST EFFICIENTLY ACCOMPLISHED IN A PACKED TOWER. CONTAMINATED WATER IS PUMPED TO THE TOP OF THE TOWER AND DISTRIBUTED UNIFORMLY ACROSS THE PACKING. AIR IS FORCED INTO THE BASE OF THE TOWER AND FLOWS UPWARD, CONTACTING THE WATER. VOCs ARE TRANSFERRED FROM THE WATER TO THE AIR AND ARE CARRIED OUT THE TOP OF THE COLUMN. TREATMENT OF THE GROUND WATER USING AIR STRIPPING IS A WELL DEMONSTRATED AND PROVEN METHOD FOR REMOVING VOCs FROM EXTRACTED GROUND WATER.

AIR EMISSIONS WOULD COMPLY WITH AIR QUALITY STANDARDS SUCH AS THE CLEAN AIR ACT AND THE UTAH AIR CONSERVATION REGULATIONS. THE OFF-GAS RESULTING FROM AIR STRIPPING CAN BE TREATED WITH CATALYTIC CONVERTERS OR GRANULAR ACTIVATED CARBON (GAC), IF NECESSARY, TO MEET AIR QUALITY STANDARDS.

SIMILARLY, ADDITIONAL POLISHING OF THE TREATED WATER USING GAC MAY BE REQUIRED IF ALL CONTAMINANTS ARE NOT REMOVED BY AIR STRIPPING. ACTIVATED CARBON REMOVES MANY ORGANIC COMPOUNDS AND IS VERY EFFECTIVE FOR MANY OF THE INDICATOR CHEMICALS THAT MAY NOT BE REMOVED FROM GROUND WATER THROUGH AIR STRIPPING, INCLUDING CHLORINATED PHENOLS, PESTICIDES, AND HERBICIDES.

OFF-SITE DISPOSAL OF FILTERS CONTAINING CONTAMINANTS WOULD BE CARRIED OUT IN ACCORDANCE WITH THE OFF-SITE POLICY.

THIS ALTERNATIVE PROVIDES SUBSTANTIAL OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT THROUGH ACTIVE REMEDIATION OF THE SHALLOW PORTION OF THE AQUIFER. THE COLLECTION OF GROUND WATER AND TREATMENT, AS NECESSARY FOR DISCHARGE, IS AN EFFECTIVE METHOD OF AQUIFER REMEDIATION AND WOULD CONTINUE UNTIL PERFORMANCE STANDARDS WERE ATTAINED. INSTITUTIONAL CONTROLS DESCRIBED ABOVE ARE EXTRA PRECAUTIONARY MEASURES TO PREVENT USE OF CONTAMINATED GROUND WATER.

THE GROUND WATER EXTRACTION (WITH OPTIONAL CONTAINMENT) AND TREATMENT WITH AIR STRIPPING CONTEMPLATED UNDER THIS ALTERNATIVE IS EXPECTED TO ATTAIN THE ACTION LEVELS FOR THE SITE. THIS ALTERNATIVE IS THEREFORE EXPECTED TO MEET REQUIREMENTS OF THE STATE AND FEDERAL SAFE DRINKING WATER ACTS, THE CLEAN WATER ACT, UTAH WATER QUALITY STANDARDS REGULATIONS, AND THE RCRA GROUND WATER CORRECTIVE ACTION REQUIREMENTS.

THE 30-YEAR PRESENT WORTH OF THIS ALTERNATIVE IS \$550,000. THE ESTIMATED IMPLEMENTATION TIME IS FIVE YEARS FOR SUBSTANTIAL REDUCTION OF CONTAMINANT LEVELS.

GROUND WATER COLLECTION, OPTIONAL CONTAINMENT, AND TREATMENT WITH ADVANCED OXIDATION PROCESSES (AOP) (ALTERNATIVE GW-2B)

UNDER ALTERNATIVE GW-2B, EXTRACTED GROUND WATER WOULD BE TREATED, IF IT DOES NOT MEET POTW OR UPDES STANDARDS, WITH ADVANCED OXIDATION PROCESSES. TWO TYPES OF AOPS ARE COMMERCIALY AVAILABLE FOR GROUND WATER REMEDIATION: (1) OZONE WITH ULTRAVIOLET (UV) RADIATION, AND (2) HYDROGEN PEROXIDE WITH UV RADIATION. THESE TREATMENT TECHNOLOGIES ARE BASED ON THE ADDITION OF HYDROGEN PEROXIDE OR OZONE TO OXIDIZE ORGANIC COMPOUNDS WITH UV ENHANCEMENT OF REACTIONS. PREVIOUS PILOT SCALE TESTS AND TREATMENT APPLICATIONS HAVE SHOWN THAT UV OXIDATION, USING EITHER OZONE OR HYDROGEN PEROXIDE, IS SUCCESSFUL FOR TREATING GROUND WATER AFFECTED WITH CONTAMINANTS SUCH AS THOSE FOUND ON THE WASATCH CHEMICAL SITE. REMOVAL LEVELS HAVE BEEN REPORTED TO BE IN THE 80 TO 99 PERCENT RANGE FOR VOCs. BENCH-SCALE TREATABILITY TESTS ARE RECOMMENDED TO DETERMINE DOSAGE RATES, REACTION TIMES, AND EXPECTED EFFLUENT QUALITY. ADDITIONALLY, THE ABILITY TO ACHIEVE DISCHARGE TREATMENT OR PRETREATMENT REQUIREMENTS CAN BE MORE READILY ASSESSED WITH RESULTS OF LABORATORY TREATABILITY STUDIES.

THE OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT IS IDENTICAL TO ALTERNATIVE NO. 2A (COLLECTION AND TREATMENT WITH AIR STRIPPING). TREATMENT OF THE EXTRACTED GROUND WATER WITH AOP, IF NECESSARY, IS AN EFFECTIVE PROCESS FOR VOC REMOVAL, AND IS EXPECTED TO MEET EITHER DISCHARGE OR PRETREATMENT STANDARDS.

AS WITH ALTERNATIVE 2A, THIS ALTERNATIVE WOULD MEET OR EXCEED THE ACTION LEVELS MENTIONED ABOVE. GROUND WATER EXTRACTION (WITH OPTIONAL CONTAINMENT) AND TREATMENT WITH AOP WOULD CONTINUE UNTIL PERFORMANCE STANDARDS WERE ATTAINED.

THE 30-YEAR PRESENT WORTH FOR ALTERNATIVE GW-2B IS \$980,000. THE ESTIMATED IMPLEMENTATION TIME IS FIVE YEARS FOR SUBSTANTIAL REDUCTION OF CONTAMINANT LEVELS.

GROUND WATER CONTAINMENT, COLLECTION, AND TREATMENT (ALTERNATIVES GW-3A AND GW-3B)

THE PRINCIPAL OBJECTIVE OF THESE ALTERNATIVES IS CONTAINMENT OF GROUND WATER TO PREVENT IT FROM MIGRATING FURTHER OFF-SITE, WITH A SECONDARY OBJECTIVE BEING EXTRACTION AND, IF NECESSARY, TREATMENT.

THESE ALTERNATIVES INVOLVE THE CONTAINMENT OF AFFECTED GROUND WATER BY CONSTRUCTING A SUBSURFACE SOILS-BENTONITE SLURRY WALL, THE COLLECTION OF GROUND WATER BY SUBSURFACE DRAINS AND/OR A SERIES OF EXTRACTION WELLS, AND TREATMENT, IF NECESSARY, OF THE EXTRACTED GROUND WATER WITH (1) AIR STRIPPING OR (2) AOP, AND SUBSEQUENT DISCHARGE TO THE 700 WEST DITCH OR POTW.

THE SUBSURFACE SOILS-BENTONITE SLURRY WALL WOULD COMPLETELY SURROUND THE CHARACTERIZED AREA OF GROUND WATER CONTAMINATION ADJACENT TO THE SITE EXTENDING TO NEAR THE RAILROAD TRACKS EAST OF THE ENTRADA PROPERTY AND INCLUDING THE SOUTHERN PORTION OF THE STEELCO PROPERTY (SEE FIGURE 5.2). THE SOILS-BENTONITE SLURRY WALL WOULD BE CONSTRUCTED BY EXCAVATING A TRENCH USING A BENTONITE SLURRY TO SHORE THE TRENCH DURING EXCAVATION. THE TRENCH WOULD THEN BE BACKFILLED WITH A BLENDED MIXTURE OF SOILS AND BENTONITE. A CONTAINMENT WALL IS

EFFECTIVE FOR LIMITING GROUND WATER MIGRATION BECAUSE ITS LOW PERMEABILITY SEVERELY RESTRICTS DOWNGRAIENT WATER MOVEMENT AND PREVENTS WIDESPREAD MIGRATION.

THIS CONTAINMENT WALL ADDS FLEXIBILITY TO A PUMPING AND COLLECTION SYSTEM BY PROVIDING AN ADDITIONAL MEANS OF CONTROLLING GROUND WATER FLOW. HOWEVER, IN SOME INSTANCES, FULL CONTAINMENT OF A SITE CAN INHIBIT FLUSHING OF THE GROUND WATER, THEREBY INHIBITING LONG TERM EFFECTIVENESS BY PROLONGING THE TIME NECESSARY TO ACHIEVE ACTION LEVELS. SOILS-BENTONITE SLURRY WALLS ARE EASILY CONSTRUCTED WITH CONVENTIONAL EQUIPMENT. THE SITE HYDROGEOLOGY AND TOPOGRAPHY ARE FAVORABLE FOR CONSTRUCTION AND NO DIFFICULTIES ARE ANTICIPATED WITH IMPLEMENTATION.

GROUND WATER WITHIN THE BOUNDARY OF THE SLURRY WALL WOULD BE PUMPED AND, IF NECESSARY, TREATED WITH AIR STRIPPING OR AOP AS DESCRIBED FOR ALTERNATIVES GW-2A AND GW-2B.

GROUND WATER CONTAINMENT, COLLECTION, AND TREATMENT WITH AIR STRIPING (ALTERNATIVE G\V-3A1

GROUND WATER WITHIN THE BOUNDARY OF THE SLURRY WALL WOULD BE PUMPED AND, IF NECESSARY, TREATED WITH AIR STRIPPING AS DESCRIBED FOR ALTERNATIVE GW-2A. THE 30-YEAR PRESENT WORTH OF ALTERNATIVE GW-3A IS \$9,000. THE ESTIMATED TIME FOR IMPLEMENTATION IS FIVE YEARS FOR SUBSTANTIAL REDUCTION OF CONTAMINANT LEVELS.

GROUND WATER CONTAINMENT, COLLECTION, AND TREATMENT WITH ADVANCED OXIDATION PROCESSES (ALTERNATIVE GW-2B)

GROUND WATER WITHIN THE BOUNDARY OF THE SLURRY WALL WOULD BE PUMPED AND, IF NECESSARY, TREATED WITH ADVANCED OXIDATION PROCESSES AS DESCRIBED FOR ALTERNATIVE GW-2B. THE 30-YEAR PRESENT WORTH OF ALTERNATIVE GW-3B IS \$1,200,000. THE ESTIMATED TIME FOR IMPLEMENTATION IS FIVE YEARS FOR SUBSTANTIAL REDUCTION OF CONTAMINANT LEVELS.

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SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

THE ALTERNATIVES IDENTIFIED IN THE FS WERE EVALUATED AGAINST THE NINE KEY CRITERIA ESTABLISHED IN THE NCP. THESE CRITERIA ARE:

- (1) OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT;
- (2) COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS;
- (3) USE OF TREATMENT TO ACHIEVE A REDUCTION IN THE TOXICITY, MOBILITY OR VOLUME OF CONTAMINANTS;
- (4) LONG-TERM EFFECTIVENESS AND PERMANENCE IN PROTECTING HUMAN HEALTH AND THE ENVIRONMENT;
- (5) SHORT-TERM EFFECTIVENESS IN PROTECTING HUMAN HEALTH AND THE ENVIRONMENT;
- (6) IMPLEMENTABILITY;
- (7) COST EFFECTIVENESS;
- (8) STATE ACCEPTANCE; AND
- (9) COMMUNITY ACCEPTANCE.

CRITERIA 1 AND 2 ARE THRESHOLD CRITERIA WHICH MUST BE MET BY THE SELECTED REMEDIAL ACTION ALTERNATIVE. CRITERIA 3, 4, 5, 6 AND 7 ARE BALANCING CRITERIA. THE FINAL TWO MODIFYING CRITERIA ARE USED TO EVALUATE THE ALTERNATIVES BASED ON UDOH AND LOCAL CONCERNS.

THE STRENGTHS AND WEAKNESSES OF THE ALTERNATIVES WERE WEIGHED TO IDENTIFY THE ALTERNATIVE PROVIDING THE BEST BALANCE AMONG THE NINE CRITERIA. A DISCUSSION OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES IS PROVIDED BELOW, FOLLOWED BY A DISCUSSION OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES FOR GROUND WATER.

SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

ALL OF THE REMEDIAL ALTERNATIVES FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES, WITH THE EXCEPTION OF ALTERNATIVE 1 (NO ACTION), ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. ALTERNATIVES 4 (IN SITU VITRIFICATION), 5 (GLYCOLATE DECHLORINATION AND OFF-SITE INCINERATION OF DIOXIN REMOVAL WASTES) AND 8

(OFF-SITE DISPOSAL AND OFF-SITE INCINERATION OF DIOXIN REMOVAL WASTES) ACHIEVE PROTECTION BY REMOVAL AND/OR DESTRUCTION OF CONTAMINANTS. ALTERNATIVE 7 (CAPPING AND OFF-SITE INCINERATION OF DIOXIN REMOVAL WASTES) WOULD PREVENT EXPOSURE TO CONTAMINANTS BY CAPPING. THE LANDFARMING OF SOILS CONTAMINATED WITH XYLENE AND TOLUENE PROVIDES AN EXTRA MEASURE OF PROTECTION UNDER ALTERNATIVES 4, 5 AND 8 BY REDUCING THE LEVELS OF THESE HYDROCARBONS THROUGH BIOLOGICAL DEGRADATION AND VOLATILIZATION.

ALTERNATIVE 4 IS THE MOST PROTECTIVE OF THE ALTERNATIVES BECAUSE THE SITE CONTAMINANTS COULD BE PERMANENTLY DESTROYED AND RENDERED HARMLESS USING A SINGLE TECHNOLOGY APPLIED ON-SITE. THIS METHOD WILL DESTROY DIOXINS AND ALL OTHER CHEMICAL CONTAMINANTS THAT PRESENT A HAZARD TO HUMAN HEALTH AT THE SITE, AND INVOLVES MINIMAL SHORT-TERM RISKS.

THE APEG PROCESS IN ALTERNATIVE 5 ALSO TREATS DIOXINS AND MOST OTHER CONTAMINANTS FOUND AT THE SITE, BUT THERE IS SOME UNCERTAINTY REGARDING ITS EFFECTIVENESS IN THE TREATMENT OF HERBICIDES IN CONCENTRATED DIOXIN REMOVAL WASTES. ALTERNATIVE 5, HOWEVER, PROVIDES FOR THE OFF-SITE INCINERATION OF HERBICIDE-CONTAMINATED RESIDUALS THAT MAY RESULT FROM THE GLYCOLATE DECHLORINATION PROCESS. THIS INCINERATION WOULD ENSURE ADEQUATE OVERALL PROTECTIVENESS.

ALTERNATIVE 7 RESULTS IN NO REDUCTION IN CONTAMINANT VOLUME OR TOXICITY, EXCEPT TO THE EXTENT THAT DIOXIN REMOVAL WASTES WOULD EVENTUALLY BE INCINERATED. MOBILITY OF THE CONTAMINANTS WOULD BE REDUCED THROUGH PLACEMENT OF THE CAP. PROTECTIVENESS WOULD BE ACHIEVED BY MEANS OF CONSTRUCTING A CAP WHICH SERVES AS A BARRIER BETWEEN THE CONTAMINANTS AND POTENTIAL HUMAN RECEPTORS AND BY APPLYING INSTITUTIONAL CONTROLS. UNFORESEEN EXPOSURE SCENARIOS, THE NEED TO PROVIDE LONG-TERM MAINTENANCE OF THE CAP, AND THE POTENTIAL FOR CONTINUED RELEASES TO GROUND WATER, PRESENT THREE SOURCES OF UNCERTAINTY IN THE OVERALL PROTECTIVENESS OF THIS ALTERNATIVE.

ALTERNATIVE 8 WOULD NOT PERMANENTLY DESTROY CONTAMINANTS, EXCEPT FOR DIOXIN REMOVAL WASTES WHICH WOULD BE INCINERATED OFF-SITE. CONTAMINATED MEDIA WOULD BE REMOVED FROM THE SITE AND THUS WOULD NO LONGER PRESENT A RISK TO THE POPULATIONS CURRENTLY THREATENED, BUT THE CONTAMINATED MEDIA WOULD REQUIRE LONG-TERM MANAGEMENT AT THE DISPOSAL FACILITY.

ALTERNATIVES 1, 7 AND 8 RELY ON OFF-SITE INCINERATION OF DIOXIN REMOVAL WASTES, WHICH IS NOT CURRENTLY IMPLEMENTABLE. THIS MATERIAL WOULD REMAIN STORED ON-SITE FOR AN INDEFINITE PERIOD. THEREFORE, ALTERNATIVE 4 WOULD ACHIEVE PROTECTIVENESS FROM THESE HAZARDOUS MATERIALS MORE QUICKLY THAN ALTERNATIVE 7 OR 8.

THE NO ACTION ALTERNATIVE WOULD NOT PROVIDE ANY PROTECTION AGAINST THE EXISTING THREAT TO HUMAN HEALTH AND THE ENVIRONMENT FROM SITE CONTAMINANTS, EXCEPT THAT DIOXIN REMOVAL WASTES WOULD BE INCINERATED OFF-SITE. MANY OF THE SITE CONTAMINANTS ARE VERY PERSISTENT IN THE ENVIRONMENT, AND NATURAL DISPERSION PROCESSES WILL CONTINUE TO INCREASE THE AREA AFFECTED BY SITE CONTAMINANTS FOR MANY YEARS. WITH NO ACTION, HUMAN EXPOSURE TO SITE CONTAMINANTS WOULD CONTINUE AT PRESENT LEVELS. FOR THESE REASONS, THE NO ACTION ALTERNATIVE IS ONLY BRIEFLY CONSIDERED IN THIS EVALUATION.

BECAUSE THE SOILS ACTION LEVELS ESTABLISHED IN THIS ROD ARE HEALTH-BASED STANDARDS FOR INDUSTRIAL USE OF THE SITE, AND NOT UNLIMITED USE WITH UNRESTRICTED EXPOSURE, EACH REMEDIAL ACTION ALTERNATIVE WILL REQUIRE A FIVE-YEAR REVIEW UNDER SECTION 121(C) OF CERCLA, SECTION 300.430(FL(4)(II)) OF THE NCP, AND APPLICABLE GUIDANCE, TO ASSURE THE LONG-TERM EFFECTIVENESS OF THE REMEDY.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

APPLICABLE REQUIREMENTS ARE THOSE CLEANUP STANDARDS, STANDARDS OF CONTROL, AND OTHER SUBSTANTIVE REQUIREMENTS, CRITERIA, OR LIMITATIONS PROMULGATED UNDER FEDERAL OR STATE LAW THAT SPECIFICALLY ADDRESS A HAZARDOUS SUBSTANCE, POLLUTANT, CONTAMINANT, REMEDIAL ACTION, OR LOCATION, AT A CERCLA SITE. RELEVANT AND APPROPRIATE REQUIREMENTS ARE SIMILAR REQUIREMENTS THAT, WHILE NOT APPLICABLE, CLEARLY ADDRESS PROBLEMS OR SITUATIONS SUFFICIENTLY SIMILAR TO THOSE ENCOUNTERED AT A CERCLA SITE SUCH THAT THEIR USE IS WELL SUITED TO THE PARTICULAR SITE.

ALL THE REMEDIAL ACTION ALTERNATIVES EXCEPT ALTERNATIVE 1 WOULD COMPLY WITH ARARS. SOME ALTERNATIVES REQUIRE INTERIM WAIVERS OR VARIANCES IN ORDER TO COMPLY WITH ARARS. THESE INSTANCES ARE DESCRIBED BELOW.

ALTERNATIVE 7, CAPPING AND OFF-SITE INCINERATION OF DIOXIN REMOVAL WASTES, WOULD MEET ALL ARARS IDENTIFIED IN TABLE 10.1. CONSTRUCTION OF THE CAP WOULD MEET RELEVANT AND APPROPRIATE RCRA CAPPING REQUIREMENTS. THE ALTERNATIVE WOULD BE CARRIED OUT TO MEET RCRA RELEVANT AND APPROPRIATE LANDFILL REQUIREMENTS. OFF-SITE INCINERATION OF DIOXIN REMOVAL WASTES WOULD FOLLOW THE OFF-SITE POLICY.

ALTERNATIVE 8, OFF-SITE DISPOSAL AND OFF-SITE INCINERATION OF DIOXIN REMOVAL WASTES, WOULD MEET ALL ARARS IDENTIFIED IN TABLE 10.1. DISPOSAL OFF-SITE OF HAZARDOUS MATERIAL FROM THE SITE WOULD FOLLOW THE OFF-SITE POLICY. AS AN ADDED MEASURE OF PROTECTIVENESS, RCRA PRE-TRANSPORTATION AND TRANSPORTATION REQUIREMENTS WOULD BE COMPLIED WITH, ALTHOUGH RCRA WOULD NOT BE APPLICABLE OFF-SITE. OFF-SITE INCINERATION OF DIOXIN REMOVAL

WASTES WOULD FOLLOW THE OFF-SITE POLICY.

ALTERNATIVE 4, IN-SITU VITRIFICATION, WOULD MEET ALL ARARS IDENTIFIED IN TABLE 10.1, BUT WOULD REQUIRE AN IMW FOR THE RELEVANT AND APPROPRIATE LDILS DURING STAGING OF THE WASTE MATERIALS PRIOR TO TREATMENT. UPON COMPLETION OF THIS ALTERNATIVE, HOWEVER, THE IMW WOULD NO LONGER BE NEEDED, SINCE LDR REQUIREMENTS WOULD BE MET. RELEVANT AND APPROPRIATE RCRA MINIMUM TECHNOLOGY REQUIREMENTS WOULD BE MET DURING STAGING TO PREVENT CONTAMINANT MIGRATION PRIOR TO TREATMENT. THIS ALTERNATIVE WILL FULLY COMPLY WITH FEDERAL AND STATE AIR QUALITY REGULATIONS SUCH AS THE CLEAN AIR ACT PRIMARY AND SECONDARY AIR QUALITY STANDARDS AND THE UTAH AIR CONSERVATION REGULATIONS. OFF-SITE DISPOSAL OF ANY FILTERS USED IN THIS ALTERNATIVE WOULD FOLLOW THE OFF-SITE POLICY. DISCHARGE OF WATER RESULTING FROM DEWATERING THE FORMER EVAPORATION POND WOULD MEET UPDES OR POTW REQUIREMENTS.

ALTERNATIVE 5, GLYCOLATE DECHLORINATION AND OFF-SITE INCINERATION OF DIOXIN REMOVAL WASTES WOULD MEET ALL ARARS IDENTIFIED IN TABLE 10.1, BUT A SOI DEBRIS TREATABILITY VARIANCE MIGHT BE NEEDED TO COMPLY WITH RELEVANT AND APPROPRIATE LDRS. THIS ALTERNATIVE WOULD FULLY COMPLY WITH FEDERAL AND STATE AIR QUALITY REGULATIONS SUCH AS THE CLEAN AIR ACT PRIMARY AND SECONDARY AIR QUALITY STANDARDS AND THE UTAH AIR CONSERVATION REGULATIONS. OFF-SITE INCINERATION OF DIOXIN REMOVAL WASTES WOULD FOLLOW THE OFF-SITE POLICY.

THE LANDFARMING PORTION OF ALTERNATIVES 4,5 AND 8 WOULD COMPLY WITH ARARS LISTED IN TABLE 10.1. RCRA LDRS WOULD NOT BE RELEVANT AND APPROPRIATE BECAUSE THE LANDFARMING WOULD TAKE PLACE WITHIN ONE AOC. ARARS RELATED TO LAND TREATMENT ARE ALSO DISCUSSED IN SECTIONS 7 AND 9 OF THIS ROD.

AN EVALUATION OF ALL FEDERAL AND STATE ARARS IS PROVIDED IN TABLE 10.1.

LONG-TERM EFFECTIVENESS AND PERMANENCE

LONG TERM EFFECTIVENESS AND PERMANENCE REFERS TO AN ALTERNATIVE'S ABILITY TO MAINTAIN RELIABLE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT OVER TIME. THIS CRITERION INCLUDES THE CONSIDERATION OF RESIDUAL RISK AND THE ADEQUACY AND RELIABILITY OF CONTROLS.

ALL OF THE REMEDIAL ACTION ALTERNATIVES FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES, WITH THE EXCEPTION OF ALTERNATIVES 1 AND 7, RESULT IN MINIMAL RESIDUAL RISK. ALTERNATIVES 4 AND 5 HAVE THE GREATEST DEGREE OF EFFECTIVENESS AND PERMANENCE BECAUSE BOTH RESULT IN A PERMANENT REDUCTION IN RISK THROUGH DESTRUCTION OF CONTAMINANTS. ALTERNATIVE 4 IS SLIGHTLY MORE EFFECTIVE IN THE LONG TERM THAN ALTERNATIVE 5, SINCE THE GLYCOLATE DECHLORINATION PROCESS WOULD RESULT IN SLIGHTLY HIGHER RESIDUAL LEVELS OF CONTAMINATION AFTER PROCESSING.

ALTERNATIVE 8 REPRESENTS A PERMANENT REMEDY FOR DIOXIN REMOVAL WASTES BUT NOT FOR OTHER HAZARDOUS MATERIALS, SINCE THESE MATERIALS WOULD REQUIRE LONG-TERM MANAGEMENT AT AN OFF-SITE DISPOSAL FACILITY. HOWEVER, REMOVAL OF THESE MATERIALS FROM THE SITE WOULD RESULT IN THE SAME PERMANENT REDUCTION IN RISK TO ON- AND OFF-SITE WORKERS AND OFF-SITE RESIDENTS THAT WOULD BE ACHIEVED BY ALTERNATIVES 4 AND 5.

LANDFARMING CONDUCTED UNDER ALTERNATIVES 4, 5 AND 8 WOULD REDUCE RISK ASSOCIATED WITH HYDROCARBON CONTAMINATED SOILS BY PERMANENTLY REDUCING CONTAMINANT LEVELS THROUGH BIOLOGICAL DEGRADATION AND VOLATILIZATION. THIS ACTION ADDS TO THE LONG-TERM EFFECTIVENESS AND PERMANENCE OF THESE ALTERNATIVES.

NO PERMANENT REDUCTION IN RISK WOULD BE ACHIEVED BY ALTERNATIVE 7. THE DEGREE OF LONG-TERM EFFECTIVENESS OF THE CAPPING ALTERNATIVE WOULD DEPEND UPON THE LONG-TERM MAINTENANCE OF THE CAP AND ON THE EFFECTIVENESS OF INSTITUTIONAL CONTROLS. IN ADDITION, SINCE CONTAMINATED SOILS AND SLUDGES WOULD CONTINUE TO BE POTENTIAL SOURCES OF GROUND WATER CONTAMINATION, THE CAPPING ALTERNATIVE WOULD REQUIRE LONG-TERM MANAGEMENT OF GROUND WATER.

BECAUSE THE SOILS ACTION LEVELS ESTABLISHED IN THIS ROD ARE HEALTH-BASED STANDARDS FOR INDUSTRIAL USE OF THE SITE, AND NOT UNLIMITED USE WITH UNRESTRICTED EXPOSURE, EACH REMEDIAL ACTION ALTERNATIVE WILL REQUIRE A FIVE-YEAR REVIEW UNDER SECTION 121(C) OF CERCLA, SECTION 300.430(F)(4)(II) OF THE NC?, AND APPLICABLE GUIDANCE, TO ASSURE THE LONG-TERM EFFECTIVENESS OF THE REMEDY. HOWEVER, ONCE IT IS DETERMINED THAT ISV TREATMENT IN ALTERNATIVE 4 HAS RESULTED IN ATTAINING HEALTH-BASED ACTION LEVELS FOR UNLIMITED USE, THERE WILL BE NO NEED FOR CONTINUED MONITORING OF THE NON-HAZARDOUS VITRIFIED MATERIAL.

REDUCTION OF TOXICITY MOBILITY OR VOLUME THROUGH TREATMENT

CONGRESS HAS EXPRESSED A PREFERENCE UNDER CERCLA, AS AMENDED BY SARA, FOR SELECTING REMEDIAL ACTIONS THAT EMPLOY TREATMENT TECHNOLOGIES THAT PERMANENTLY AND SIGNIFICANTLY REDUCE TOXICITY, MOBILITY, OR VOLUME OF HAZARDOUS SUBSTANCES AS THEIR PRINCIPAL ELEMENT.

THE ISV, APEG PROCESS, AND OFF-SITE DISPOSAL/INCINERATION ALTERNATIVES (ALTERNATIVES 4, 5, AND 8) WOULD GREATLY REDUCE TOXICITY, MOBILITY, AND VOLUME OF SOILS AND SLUDGES EXCEEDING ACTION LEVELS AT THE SITE. ONLY

UNDER ALTERNATIVES 4 AND 5 WOULD THE REDUCTIONS IN TOXICITY THROUGH TREATMENT EXTEND TO CONTAMINATED SITE MEDIA OTHER THAN THE DIOXIN REMOVAL WASTES AND HYDROCARBON CONTAMINATED SOILS TO BE LANDFARMED. IN THE CASE OF ALTERNATIVE 4, WHICH BEST MEETS THIS CRITERION, ISV TREATABILITY STUDIES USING SITE MEDIA HAVE DEMONSTRATED THAT DESTRUCTION AND REMOVAL EFFICIENCIES IN THE RANGE OF 99.997 PERCENT TO 99.99995 PERCENT CAN BE ACHIEVED FOR ALL SITE CONTAMINANTS, INCLUDING DIOXINS. IN THE CASE OF APEG, USED IN ALTERNATIVE 5, A DESTRUCTION AND REMOVAL EFFICIENCY OF 99.96 PERCENT FOR DIOXIN WAS OBTAINED DURING TREATABILITY TESTING ON SOILS AND SLUDGES. SUBSTANTIAL REDUCTIONS IN THE LEVELS OF OTHER HIGHLY CHLORINATED COMPOUNDS, SUCH AS PESTICIDES, WERE ALSO OBSERVED DURING APEG TREATABILITY TESTING. THE EFFECTIVENESS OF GLYCOLATE DECHLORINATION IN TREATING SOME HERBICIDES HAS NOT BEEN CONFIRMED, AND TREATMENT OF MATERIAL WITH HIGH CONCENTRATIONS OF HERBICIDES MIGHT REQUIRE OFF-SITE INCINERATION. BECAUSE ALTERNATIVE 8, OFF-SITE DISPOSAL, DOES NOT EMPLOY TREATMENT FOR SOILS AND SLUDGES, EXCEPT FOR LAND TREATMENT OF HYDROCARBON CONTAMINATED SOILS, THE STATUTORY PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT IS NOT FULLY ADDRESSED.

ALTERNATIVE 7 WOULD REDUCE THE MOBILITY OF CONTAMINANTS IN THE SOILS BY MINIMIZING SURFACE WATER INFILTRATION, BUT WOULD NOT REDUCE TOXICITY OR VOLUME. ALTERNATIVE 1 WOULD NOT REDUCE THE TOXICITY, MOBILITY, AND VOLUME OF CONTAMINANTS IN THE SOILS AND SLUDGES.

UNDER ALL OF THE ALTERNATIVES, THE DIOXIN REMOVAL WASTES WOULD BE TREATED TO PERMANENTLY REDUCE THEIR TOXICITY. THIS WOULD OCCUR BY DESTRUCTION THROUGH PYROLYSIS (THERMAL DECOMPOSITION) IN THE CASE OF ALTERNATIVE 4, THROUGH CHEMICAL REACTION IN THE CASE OF ALTERNATIVE 5, AND THROUGH OFF-SITE INCINERATION UNDER THE REMAINING ALTERNATIVES. THE GLYCOLATE DECHLORINATION TREATMENT OF THE DIOXIN REMOVAL WASTE UNDER ALTERNATIVE 5 MIGHT RESULT IN RESIDUAL LEVELS OF HERBICIDES FOLLOWING TREATMENT. THESE RESIDUALS WOULD BE INCINERATED. ANY RESIDUAL VOLATILE CONTAMINANTS COLLECTED IN THE VOLATILE EMISSION CONTROL SYSTEMS PROVIDED UNDER ALTERNATIVES 4 AND 5 WOULD BE DISPOSED OF OFF-SITE AT A RCRA TREATMENT, STORAGE, OR DISPOSAL FACILITY.

SHORT-TERM EFFECTIVENESS

SHORT-TERM EFFECTIVENESS REFERS TO THE PERIOD OF TIME NEEDED TO COMPLETE THE REMEDY, AND ANY ADVERSE IMPACTS ON HUMAN HEALTH AND THE ENVIRONMENT THAT MAY BE POSED DURING THE CONSTRUCTION AND IMPLEMENTATION OF THE REMEDY.

ALTERNATIVE 7 INVOLVES THE LEAST SIGNIFICANT SHORT-TERM IMPACTS. ALTERNATIVE 4 PRESENTS THE NEXT LOWEST RISK DURING IMPLEMENTATION. ALTERNATIVE 5 POSES FURTHER COMPLICATIONS DUE TO INCREASED HANDLING OF CONTAMINATED MEDIA, AND ALTERNATIVE 8 HAS THE GREATEST SHORT-TERM IMPACTS BECAUSE IT INVOLVES THE TRANSPORT OF ALL MEDIA CONTAMINATED ABOVE ACTION LEVELS.

ALTERNATIVES 7 AND 8 WOULD REQUIRE THE LEAST AMOUNT OF TIME TO IMPLEMENT, ONE MONTH AND TWO TO FOUR MONTHS, RESPECTIVELY. THESE ALTERNATIVES, HOWEVER, REQUIRE INCINERATION OF MATERIAL CONTAINING DIOXIN, WHICH IS NOT CURRENTLY IMPLEMENTABLE. IT IS NOT KNOWN WHEN THIS INCINERATION COULD TAKE PLACE, SINCE NO INCINERATORS ARE CURRENTLY PERMITTED TO ACCEPT THIS TYPE OF HAZARDOUS MATERIAL. ALTERNATIVES 4 AND 5 ARE EXPECTED TO REQUIRE SIX MONTHS FOR IMPLEMENTATION. IMPLEMENTATION OF THE LANDFARMING COMPONENT OF ALTERNATIVES 4, 5 AND 8 IS EXPECTED TO REQUIRE THREE MONTHS FOR COMPLETION.

NONE OF THE ALTERNATIVES IS WITHOUT SHORT-TERM IMPACTS. HOWEVER, ALTERNATIVE 7, WHICH INVOLVES CAPPING OF UNPAVED AREAS, WOULD PROBABLY INVOLVE THE LEAST SIGNIFICANT SHORT-TERM IMPACTS. UNDER THIS ALTERNATIVE, SHORT-TERM IMPACTS WOULD BE LIMITED TO EXPOSURE OF WORKERS TO DUST, AND DIRECT CONTACT WITH SOILS FROM EARTHMOVING ACTIVITIES IN PREPARING THE SITE FOR CAPPING. ALTERNATIVES 1, 5, AND 7 REQUIRE OFFSITE TRANSPORT OF DIOXIN REMOVAL WASTE FOR INCINERATION AND ALTERNATIVE 8 REQUIRES OFF-SITE TRANSPORT OF ALL CONTAMINATED MEDIA ABOVE ACTION LEVELS. ALTHOUGH THE PROBABILITY OF TRAFFIC ACCIDENTS AND SPILLS ASSOCIATE WITH OFF-SITE TRANSPORT IS SMALL, SUCH INCIDENTS COULD POTENTIALLY INVOLVE A LARGE POPULATION AND UNKNOWN ENVIRONMENTAL RISKS.

ALTERNATIVES 4, 5, AND 8 ALL REQUIRE EXCAVATION OF THE SAME VOLUME OF SOILS AND WOULD RESULT IN AN INCREASED LEVEL OF RISK TO WORKERS FROM POTENTIAL EXPOSURE TO DUST AND DIRECT CONTACT WITH CONTAMINANTS.

ALTERNATIVES 4 AND 5 INVOLVE SHORT-TERM RISKS RELATED TO THE CONSTRUCTION AND IMPLEMENTATION OF THE TREATMENT PROCESS. MOST OF THESE RISKS WOULD IMPACT ONLY WORKERS INVOLVED IN THE REMEDIAL ACTION. THE ACTIVE SITE OPERATIONS WOULD BE DISCONTINUED BY THE TIME REMEDIAL ACTION IS IMPLEMENTED, SO ONLY TRAINED REMEDIAL ACTION WORKERS WOULD BE AT RISK DURING THE ACTION. SHORT-TERM RISKS FROM HANDLING THE CONTAMINATED MEDIA PRIOR TO TREATMENT WOULD BE SOMEWHAT GREATER FOR THE APEG PROCESS BECAUSE THE METHOD REQUIRES CRUSHING MATERIAL LARGER THAN 4 INCHES IN DIAMETER PRIOR TO PROCESSING IN THE BATCH REACTOR. THE CRUSHING PROCESS MAY GENERATE FUGITIVE DUST, REQUIRING DUST CONTROL MEASURES. IN ADDITION, EXCAVATION AND TRANSPORT OF CONTAMINATED SOILS FOR ALTERNATIVES 4, 5 AND 8 (INCLUDING THOSE SOILS TO BE LANDFARMED) MAY CAUSE SOME OF THE VOLATILE CONTAMINANTS TO BE RELEASED TO THE AIR. APPROPRIATE PROTECTIVE CLOTHING WILL BE WORN AND AIR MONITORING PERFORMED TO REDUCE EXPOSURES TO WORKERS.

IN ADDITION, ALTERNATIVES 4 AND 5 EMPLOY INNOVATIVE TECHNOLOGIES WHICH HAVE NOT BEEN WIDELY USED AT FULL SCALE TO REMEDIATE SITES. HOWEVER, BOTH PROCESSES HAVE BEEN FULLY TESTED AT PILOT SCALE. FOR BOTH PROCESSES, VOLATILE EMISSIONS WOULD BE CAPTURED IN A HOOD AND THE EFFLUENT AIR STREAM WOULD BE SCRUBBED BY ACTIVATED CARBON FILTERS. AMBIENT AIR AND THE TREATMENT SYSTEM EXHAUST WOULD BE MONITORED TO VERIFY THAT UNACCEPTABLE LEVELS OF PARTICULATES AND VOLATILE CONTAMINANTS ARE NOT RELEASED TO THE ATMOSPHERE.

THE FORMER EVAPORATION POND CONTENTS WOULD BE DEWATERED BY PUMPING PRIOR TO REMOVAL OR TREATMENT UNDER ALTERNATIVES 4, 5 AND 8. PRIOR TO DISCHARGE TO THE SEWER OR TO THE 700 WEST DITCH, THE WATER REMOVED FROM THE FORMER EVAPORATION POND WOULD BE TREATED, IF NECESSARY, TO MEET UPDES OR POTW STANDARDS.

IMPLEMENTABILITY

IMPLEMENTABILITY REFERS TO THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF A REMEDY, INCLUDING THE AVAILABILITY OF MATERIALS AND SERVICES NEEDED TO IMPLEMENT THE CHOSEN REMEDY.

ALTERNATIVE 4, ALTHOUGH USING AN INNOVATIVE TECHNOLOGY, IS THE MOST READILY IMPLEMENTED OVERALL. AS MENTIONED ABOVE, THE IMPLEMENTATION OF THIS ALTERNATIVE WOULD REQUIRE AN IMV OF LDRS IN ORDER TO PLACE THE DIOXIN REMOVAL WASTES INTO THE FORMER EVAPORATION POND PRIOR TO TREATMENT. ALTERNATIVE 5 MIGHT REQUIRE A SOILS AND DEBRIS TREATABILITY VARIANCE DUE TO THE UNCERTAINTY IN ITS TREATING SOME CONTAMINANTS. OFF-SITE INCINERATION OF TREATED RESIDUALS OF DIOXIN REMOVAL WASTES FROM THE APEG PROCESS OF ALTERNATIVE 5 SHOULD BE MORE EASILY IMPLEMENTED THAN OFF-SITE INCINERATION PROPOSED AS PART OF ALTERNATIVES 7 AND 8 SINCE CONCENTRATIONS OF DIOXIN AND OTHER HAZARDOUS CONSTITUENTS IN THE DIOXIN REMOVAL WASTES WILL BE GREATLY REDUCED BY APEG. ALTHOUGH ALTERNATIVES 4 AND 5 INVOLVE INNOVATIVE TECHNOLOGIES THAT ARE NOT YET IN FULL SCALE COMMERCIAL PRODUCTION, THE VENDORS OF BOTH TECHNOLOGIES HAVE INDICATED THAT THEIR EQUIPMENT AND SERVICES WILL BE AVAILABLE WHEN NEEDED, IF SELECTED.

ALTERNATIVES 7 AND 8 ARE THE MOST TECHNICALLY FEASIBLE BECAUSE THEY RELY ON SIMPLE EARTHMOVING AND CONSTRUCTION TECHNOLOGIES. HOWEVER, BOTH ALTERNATIVES MAY ENCOUNTER DIFFICULTY IN ADMINISTRATIVE IMPLEMENTATION DUE TO LACK OF A PERMITTED OFF-SITE INCINERATOR TO ACCEPT THE DIOXIN REMOVAL WASTES.

THE ADMINISTRATIVE AND TECHNICAL ASPECTS OF LANDFARMING HYDROCARBON CONTAMINATED SOILS ARE NOT EXPECTED TO AFFECT THE IMPLEMENTABILITY OF ALTERNATIVES 4, 5 AND 8.

COST

THIS CRITERION EVALUATES CAPITAL, OPERATION AND MAINTENANCE COSTS OF EACH ALTERNATIVE, AND COMPARES COSTS AMONG SIMILARLY PROTECTIVE REMEDIES.

COST ESTIMATES FOR EACH OF THE ALTERNATIVES ARE BASED ON INFORMATION PROVIDED BY VENDORS OR ON PUBLISHED STANDARD CONSTRUCTION COST DATA, AND ARE EXPECTED TO BE ACCURATE WITHIN A RANGE OF -30 PERCENT TO +50 PERCENT. SINCE THIS IS A WIDE RANGE, IT IS LIKELY THAT ACTUAL COSTS WILL DIFFER FROM ESTIMATES. A 10 PERCENT DISCOUNT RATE WAS APPLIED TO FUTURE EXPENDITURES TO ENABLE COMPARISON OF PRESENT VALUE. THE PRESENT VALUE OF AN ALTERNATIVE'S COST IS THE AMOUNT OF MONEY THAT WOULD HAVE TO BE ALLOCATED TODAY IN ORDER TO PAY THE COSTS OF THE ALTERNATIVE FOR ITS DURATION. TWO TYPES OF COSTS ARE CALCULATED: CAPITAL COSTS, AND ANNUAL OPERATION AND MAINTENANCE COSTS. COST SUMMARIES FOR EACH ALTERNATIVE, INCLUDING CAPITAL WORTH, ARE SHOWN IN TABLE 8.1.

OF THE ALTERNATIVES REQUIRING ACTION, ALTERNATIVE 7, AT \$660,000, HAS THE LOWEST PRESENT WORTH COST. ALTERNATIVE 8, WHICH LIKE ALTERNATIVE 7 DOES NOT INVOLVE TREATMENT OF SOILS, SLUDGES AND DEBRIS (EXCEPT FOR THAT PORTION OF SOILS TO BE LANDFARMED), HAS A PRESENT WORTH COST OF \$1,700,000. THE TWO ALTERNATIVES REQUIRING TREATMENT OF ALL CONTAMINATED SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES, ALTERNATIVES 4 AND 5, HAVE PRESENT WORTH COSTS OF \$3,300,000 AND \$4,100,000, RESPECTIVELY.

STATE ACCEPTANCE

UDOH AND EPA AGREE ON ALTERNATIVE 4 AS THE PREFERRED ALTERNATIVE FOR REMEDIATION OF SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES. BOTH AGENCIES HAVE PARTICIPATED IN THE DEVELOPMENT OF THE PROPOSED PLAN AND THE ROD.

COMMUNITY ACCEPTANCE

COMMUNITY INPUT ON THE ALTERNATIVES FOR REMEDIAL ACTION AT THE WASATCH CHEMICAL SITE WAS SOLICITED BY EPA AND UDOH DURING THE PUBLIC COMMENT PERIOD FROM OCTOBER 9, 1990 TO NOVEMBER 8, 1990. COMMENTS RECEIVED FROM THE COMMUNITY INDICATE NO OPPOSITION TO THE PREFERRED ALTERNATIVE, ALTHOUGH SEVERAL QUESTIONS REGARDING ITS IMPLEMENTATION WERE RAISED. RESPONSES TO COMMUNITY COMMENTS ARE FOUND IN THE ATTACHED RESPONSIVENESS SUMMARY.

GROUNDWATER WATER

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

WITH THE EXCEPTION OF ALTERNATIVE 1 (NO ACTION), ALL OF THE GROUND WATER ALTERNATIVES ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. THE FOUR GROUND WATER ALTERNATIVES (GW-2A, GW-2B, GW-3A AND GW-3B) DIFFER PRIMARILY IN THE ANTICIPATED RATE AT WHICH GROUND WATER WOULD BE REMEDIATED AND IN TERMS OF SHORT-TERM RISKS. THE EMPHASIS OF ALTERNATIVES GW-2A AND GW-2B IS ON COMPLETE REMEDIATION IN THE MINIMUM AMOUNT OF TIME, WHILE THE EMPHASIS OF ALTERNATIVES GW-3A AND GW-3B IS ON CONTAINMENT RATHER THAN TREATMENT. THE INSTALLATION OF A SLURRY WALL IN ALTERNATIVES GW-3A AND GW-3B INVOLVES SHORT-TERM RISKS THAT WOULD NOT BE PRESENT UNDER ALTERNATIVES GW-2A AND GW-2B, AND MAY DECREASE THE EFFECTIVENESS OF THE COLLECTION SYSTEM BY LIMITING THE RATE OF GROUND WATER COLLECTION, THEREBY SLOWING THE ULTIMATE CLEANUP OF GROUND WATER.

GW-1, THE NO ACTION ALTERNATIVE, DOES NOT PROVIDE ADEQUATE OVERALL PROTECTIVENESS OF HUMAN HEALTH AND THE ENVIRONMENT AND WOULD RESULT IN CONTINUED DISPERSION OF CONTAMINATED GROUND WATER AND EXPANSION OF THE GROUND WATER CONTAMINATION AREA. ALTERNATIVE GW-1 IS THEREFORE NOT CONSIDERED FURTHER IN THIS EVALUATION.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

ALTERNATIVES GW-2A, GW-2B, GW-3A AND GW-3B WOULD ALL EQUALLY COMPLY WITH FEDERAL AND STATE ARARS. ACTION LEVELS (TABLE 5.4) FOR CONTAMINANTS ARE FEDERAL AND STATE SAFE DRINKING WATER ACT MCLS OR PROPOSED MCLS. DISCHARGE OF AIR POLLUTANTS FOR ANY OF THE ALTERNATIVES WOULD COMPLY WITH STATE BEST AVAILABLE CONTROL TECHNOLOGY (BACT) STANDARDS TO ASSURE PROTECTIVENESS. DISCHARGE OF TREATED WATER TO THE 700 WEST DITCH OR TO THE POTW THROUGH THE SEWER SYSTEM WOULD COMPLY WITH UPDES OR POTW STANDARDS.

AN EVALUATION OF FEDERAL AND STATE ARARS FOR GROUND WATER ALTERNATIVES IS FOUND IN TABLE 10.1.

LONG-TERM EFFECTIVENESS AND PERMANENCE

ALTERNATIVES GW-2A, GW-2B, GW-3A AND GW-3B WOULD ALL OFFER A HIGH DEGREE OF PERMANENCE IN THE REDUCTION OF RISK ASSOCIATED WITH GROUND WATER IF COMBINED WITH ALTERNATIVES 4, 5 OR 8 FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES BECAUSE THE COMBINATION OF THESE ALTERNATIVES WOULD CLEAN UP GROUND WATER AND REMOVE CONTAMINANT SOURCES. HOWEVER, IF SOURCE AREAS ARE NOT REMEDIATED, AS WOULD BE THE CASE UNDER ALTERNATIVE 7 FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES, NONE OF THE GROUND WATER ALTERNATIVES COULD BE CONSIDERED PERMANENT REMEDIES.

THE LONG-TERM EFFECTIVENESS OF ALTERNATIVES GW-2A AND GW-2B IS BETTER THAN THAT OF ALTERNATIVES GW-3A AND GW-3B BECAUSE OF THE POSSIBLE DEGRADATION OF THE SLURRY WALL IN ALTERNATIVES GW-3A AND GW-3B THROUGH TIME AND SUBSEQUENT MIGRATION OF CONTAMINANTS.

REMEDIAL ACTIONS CONDUCTED UNDER ALL FOUR ALTERNATIVES WOULD REQUIRE FIVE-YEAR REVIEWS AND PERIODIC MONITORING TO ASSURE THE LONG-TERM EFFECTIVENESS OF THESE REMEDIES.

REDUCTION OF TOXICITY MOBILITY OR VOLUME THROUGH TREATMENT

ALTERNATIVES GW-2A, GW-2B, GW-3A, AND GW-3B WOULD ALL RESULT IN REDUCTION OF TOXICITY, MOBILITY AND VOLUME OF CONTAMINANTS IN GROUND WATER THROUGH TREATMENT. ALTERNATIVES GW-2A AND GW-2B WOULD REMOVE A LARGER VOLUME OF AFFECTED GROUND WATER MORE RAPIDLY THAN ALTERNATIVES GW-3A AND GW-3B, WOULD REMOVE A LARGER VOLUME OF AFFECTED GROUND WATER MORE RAPIDLY THAN ALTERNATIVES GW-3A AND GW-3B, THEREBY REDUCING TOXICITY AND VOLUME MORE QUICKLY. THE SLURRY WALL IN ALTERNATIVES GW-3A AND GW-3B WOULD MORE EFFECTIVELY REDUCE MOBILITY OF CONTAMINANTS.

SHORT-TERM EFFECTIVENESS

ALTERNATIVES GW-2A AND GW-2B RANK HIGHER IN SHORT-TERM EFFECTIVENESS THAN ALTERNATIVES GW-3A AND GW-3B. ALTERNATIVES GW-2A AND GW-2B WOULD ACHIEVE CLEANUP MORE RAPIDLY BECAUSE GREATER VOLUMES OF WATER CAN BE EXTRACTED IN THE ABSENCE OF THE SLURRY WALL. SHORT-TERM EFFECTS ASSOCIATED WITH ALTERNATIVES GW-3A AND GW-3B MAY RESULT FROM CONSTRUCTION OF THE SLURRY WALL TRENCH, PARTICULARLY IF CONTAMINATED MEDIA ARE EXPOSED DURING THE EXCAVATION AND PROBLEMS WITH EMISSIONS OF FUGITIVE DUST AND VOLATILE ORGANIC COMPOUNDS ENSUE. OTHER SHORT-TERM PROBLEMS ASSOCIATED WITH ALTERNATIVES GW-3A AND GW-3B ARE EXPECTED TO BE RELATED TO OPERATION OF CONSTRUCTION EQUIPMENT. SINCE SLURRY WALL CONSTRUCTION IS OPTIONAL (BUT NOT LIKELY) FOR ALTERNATIVES GW-2A AND GW-2B, MUCH LESS CONSTRUCTION ACTIVITY IS ANTICIPATED FOR THEM THAN FOR ALTERNATIVES GW-3A AND GW-3B.

IMPLEMENTABILITY

ALL GROUND WATER ALTERNATIVES, ALONG WITH THEIR COMPONENT TREATMENT OPTIONS, WOULD BE IMPLEMENTABLE AT THE SITE. MATERIALS AND SERVICES FOR ALL OF ALTERNATIVES ARE READILY AVAILABLE. IN PARTICULAR, ALTERNATIVES GW-2A AD GW-3A RELY ON PROVEN TECHNOLOGY FOR TREATMENT OF CONTAMINATED GROUND WATER. ALTERNATIVES GW-2B AD GW-3B, HOWEVER, ARE LESS FAVORABLE FROM A TECHNICAL IMPLEMENTABILITY STANDPOINT BECAUSE ADVANCED OXIDATION PROCESSES ARE INNOVATIVE AD REQUIRE A TREATABILITY STUDY DEMONSTRATING THEIR EFFECTIVENESS.

INSTALLATION OF A SLURRY WALL UNDER ALTERNATIVES GW-3A OR GW-3B WOULD REQUIRE OBTAINING ACCESS AGREEMENTS WITH ADJACENT PROPERTY OWNERS. SIMILARLY, ACCESS AGREEMENTS WOULD BE REQUIRED FOR INSTALLATIONS OF EXTRACTION AND MONITORING WELLS OFF THE WASATCH CHEMICAL PROPERTY UNDER ALL OF THE ALTERNATIVES. OBTAINING ACCESS AGREEMENTS MAY CAUSE DELAYS IN IMPLEMENTATION, BUT IS UNLIKELY TO PREVENT IT.

INSTITUTIONAL CONTROLS ARE GENERALLY DIFFICULT TO IMPLEMENT. CONTROLS RELATING TO GROUND WATER ARE EXPECTED TO BE PARTICULARLY DIFFICULT, FOR ADMINISTRATIVE REASONS. IT SHOULD BE NOTED, HOWEVER, THAT INSTITUTIONAL CONTROLS ARE NOT RELIED UPON AS PART OF THE REMEDY, BUT ARE USED AS EXTRA PRECAUTIONARY MEASURES.

COST ESTIMATES FOR GROUND WATER ALTERNATIVES WERE CALCULATED IN THE SAME MANNER AS THOSE FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES ALTERNATIVES. COSTS ARE SHOWN IN TABLE 8.1.

EXCLUDING THE NO ACTION ALTERNATIVE, ALTERNATIVE GW-2A HAS LOWEST PRESENT WORTH COST, \$550,000. THE OTHER THREE ALTERNATIVES IN ORDER OF INCREASING PRESENT WORTH COSTS ARE GW-3A AT \$960,000, GW-2B AT \$980,000, AND GW-3B AT \$1.2 MILLION. THE LOW COST OF ALTERNATIVE GW-2A RELATIVE TO THE OTHER ALTERNATIVES IS PRIMARILY ATTRIBUTABLE TO TWO FACTORS: (1) ADVANCED OXIDATION PROCESSES FOR GROUND WATER TREATMENT ARE MUCH MORE EXPENSIVE THAN THE AIR STRIPPING USED IN GW-2A; AND (2) THAT ALTERNATIVE DOES NOT INCLUDE THE COST OF A SLURRY WALL.

STATE ACCEPTANCE

UDOH AND EPA AGREE ON ALTERNATIVE GW-2A AS THE PREFERRED ALTERNATIVE FOR GROUND CATER REMEDIATION. AS STATED ABOVE, BOTH AGENCIES HAVE PARTICIPATED IN THE DEVELOPMENT OF THE PROPOSED PLAN AND ROD.

COMMUNITY ACCEPTANCE

AS NOTED EARLIER, THE PUBLIC COMMENT PERIOD FOR THE WASATCH CHEMICAL PROPOSED PLAN WAS HELD FROM OCTOBER 9, 1990 TO NOVEMBER 8, 1990. THE PUBLIC WAS INVITED TO COMMENT ON ALL GROUND WATER ALTERNATIVES DURING THAT PERIOD. BASED ON THE COMMENTS RECEIVED, THE COMMUNITY HAS NO OPPOSITION TO THE PREFERRED ALTERNATIVE. SOME QUESTIONS REGARDING THE EXTENT AD IMPLEMENTATION OF THE GROUND WATER REMEDIAL ACTION WERE RAISED, HOWEVER. RESPONSES TO COMMUNITY COMMENTS ARE FOUND IN THE ATTACHED RESPONSIVENESS SUMMARY.

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SELECTED REMEDY

AFTER CONSIDERATION OF THE STATUTORY REQUIREMENTS OF CERCLA, THE DETAILED ANALYSIS OF THE ALTERNATIVES, AND PUBLIC COMMENTS, EPA AND UDOH HAVE DETERMINED THAT THE MOST APPROPRIATE REMEDY FOR THE SITE IS ISV TREATMENT OF SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES AND LANDFARMING OF HYDROCARBON CONTAMINATED SOILS (ALTERNATIVE 4), AND COLLECTION AND, TO THE EXTENT NECESSARY TO MEET DISCHARGE STANDARDS, TREATMENT BY AIR STRIPPING, OF CONTAMINATED GROUND WATER (ALTERNATIVE GW-2A).

REMEDY FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES

ALTERNATIVE 4 FOR THE REMEDIATION OF SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES WILL INVOLVE CONSOLIDATION OF SOILS AND SLUDGES CONTAMINATED ABOVE SOILS ACTION LEVELS AND DIOXIN REMOVAL WASTES INTO THE FORMER EVAPORATION POND, AND VITRIFICATION OF THE FORMER EVAPORATION POND AND ITS CONTENTS.

CERTAIN ACTIONS WILL BE TAKEN AS PART OF THE REMEDY TO ENSURE COMPLIANCE WITH RCRA, SOME OF WHOSE REQUIREMENTS ARE RELEVANT AND APPROPRIATE, AS SHOWN IN TABLE 10.1. IN PARTICULAR, APPROPRIATE MEASURES WILL BE TAKEN, SUCH AS THE INSTALLATION OF AN IMPERMEABLE LINER, TO SATISFY THE RELEVANT AND APPROPRIATE PORTIONS OF RCRA MINIMUM TECHNOLOGY REQUIREMENTS. THESE MEASURES WILL BE TAKEN TO PREVENT ANY MIGRATION OF CONTAMINANTS OUT OF THE EVAPORATION POND TO THE ADJACENT SUBSURFACE SOILS OR GROUND WATER OR SURFACE WATER FROM THE TIME THE FORMER EVAPORATION POND IS UNCOVERED, DURING CONSOLIDATION OF CONTAMINATED MATERIALS IN THE POND, AND UNTIL VITRIFICATION HAS BEEN COMPLETED. TOWARD THE SAME END, LIQUID DIOXIN REMOVAL WASTES WILL BE SOLIDIFIED PRIOR TO PLACEMENT IN THE FORMER EVAPORATION POND TO COUNTER ITS MOBILE NATURE.

IN ADDITION, IF IT IS DETERMINED DURING REMEDIAL DESIGN THAT EXCESS WATER WITHIN THE FORMER EVAPORATION POND MUST BE REMOVED TO FACILITATE TREATMENT BY ISV, THE WATER WILL BE EXTRACTED AND TREATED BY FILTERING IT WITH

GRANULAR ACTIVATED CARBON TO REMOVE CONTAMINANTS, AS NECESSARY TO MEET POTW OR UPDES STANDARDS, AND WILL BE SUBSEQUENTLY DISCHARGED TO THE SEWER SYSTEM OR THE 700 WEST DITCH. THE SPENT CARBON WILL BE VITRIFIED, REGENERATED, OR APPROPRIATELY DISPOSED OF IN COMPLIANCE WITH THE OFF-SITE POLICY.

AFTER PREPARATION OF THE MATERIALS TO BE TREATED, A LAYER OF CLEAN SOILS WILL BE PLACED OVER THE MATERIAL WITHIN THE FORMER EVAPORATION POND AND THE ENTIRE PILE WILL BE VITRIFIED. VITRIFICATION WILL MEET THE PERFORMANCE STANDARDS SPECIFIED IN THIS SECTION. AN OFF-GAS COLLECTION HOOD WILL BE PLACED OVER THE AREA BEING VITRIFIED TO COLLECT EMISSIONS. AIR EMISSIONS FROM THE ISV PROCESS WILL BE MONITORED TO ENSURE THAT AIR QUALITY ARARS ARE MET. IT IS ESTIMATED THAT VITRIFICATION WILL REQUIRE APPROXIMATELY SIX MONTHS TO COMPLETE.

A TREATABILITY TEST WAS CONDUCTED TO VERIFY ISV'S EFFECTIVENESS IN TREATING CONTAMINANTS FOUND IN SOILS. A SECOND TREATABILITY TEST WILL BE CONDUCTED ON THE DIOXIN REMOVAL WASTES DURING RD TO VERIFY ISV'S EFFECTIVENESS ON THIS TYPE OF HAZARDOUS MATERIAL WHICH CONTAINS CONTAMINANTS AT LEVELS HIGHER THAN SOILS. IN ADDITION, THIS TREATABILITY TEST WILL EXAMINE WHETHER VAPOR RETREAT OCCURS DURING VITRIFICATION OF THE CONTAMINANTS FOUND AT THIS SITE. THIS TEST WILL BE CONDUCTED, AND ITS RESULTS EVALUATED, PRIOR TO IMPLEMENTING ISV AT THE SITE.

SOILS CONTAMINATED WITH TOLUENE AND XYLENE WILL BE EXCAVATED FROM AN AREA BETWEEN THE CHLORINE BUILDING AND THE WAREHOUSE BUILDING. A BERMED AREA WILL BE PREPARED ON THE ASPHALT PAVEMENT WEST OF THE WAREHOUSE BUILDING WHERE THE EXCAVATED SOILS WILL BE SPREAD AND REMEDIATED BY AERATION AND ENHANCED BIODEGRADATION OVER A PERIOD OF APPROXIMATELY THREE MONTHS. THIS LANDFARMING WILL MEET RELEVANT AND APPROPRIATE RCRA SMALL AND LAND TREATMENT REQUIREMENTS. AIR MONITORING WILL BE CONDUCTED TO ENSURE THAT AIR QUALITY ARARS ARE MET.

AS AN EXTRA PRECAUTIONARY MEASURE, ALL UNPAVED AREAS OF THE SITE WILL BE PAVED TO PREVENT FUTURE OCCUPANTS DIRECT EXPOSURE AND INGESTION OF RESIDUAL CONTAMINANTS THAT MAY REMAIN IN SOILS ON-SITE. AS AN EXTRA PRECAUTIONARY MEASURE, INSTITUTIONAL CONTROLS SUCH AS DEED RESTRICTIONS WILL BE USED TO PREVENT THE SITE FROM BEING USED FOR NON-INDUSTRIAL PURPOSES AD TO MAINTAIN ACCESS RESTRICTIONS. AGREEMENTS TO IMPLEMENT THESE CONTROLS WILL BE MADE BY EPA, UDOH, AND THE PRP'S DURING RD/RA NEGOTIATIONS. THESE CONTROLS WILL REMAIN IN PLACE FOR A PERIOD OF TIME TO BE DETERMINED DURING RD, DEPENDING UPON, AMONG OTHER FACTORS, PRACTICABILITY AND THE EXTENT ALLOWABLE BY LAW. THIS PERIOD OF TIME MAY LATER BE MODIFIED BASED ON THE EFFECTIVENESS OF THE REMEDY.

REMEDY FOR GROUND WATER

ALTERNATIVE GW-2A, FOR REMEDIATION OF CONTAMINATED GROUND WATER, WILL USE EXTRACTION WELLS AND/OR TRENCHES TO CAPTURE AND EXTRACT GROUND WATER CONTAMINATED AT CONCENTRATIONS ABOVE MCLS AND PROPOSED MCLS. THE EXTRACTED GROUND WATER WILL BE TREATED USING AIR STRIPPING, TO THE EXTENT NECESSARY, TO MEET UPDES REQUIREMENTS FOR DISCHARGE TO THE 700 WEST DITCH OR POTW REQUIREMENTS FOR DISCHARGE TO THE SEWER SYSTEM. CARBON ADSORPTION WILL BE USED IF NECESSARY TO REMOVE CONTAMINANTS NOT REMOVED BY AIR STRIPPING. MONITORING OF TREATMENT EFFLUENT STREAMS, BOTH AIR AND WATER, WILL BE CONDUCTED. CARBON ADSORPTION TREATMENT OF THE AIR EMISSIONS WILL BE USED, IF NECESSARY, TO ENSURE AIR QUALITY REQUIREMENTS ARE MET. THE REMEDIAL DESIGN WILL SPECIFY THE APPROPRIATE NUMBER AND LOCATION OF WELLS AND SYSTEM PARAMETERS SUCH AS FLOW RATES FOR THE GROUND WATER COLLECTION AND TREATMENT SYSTEM.

AS AN EXTRA PRECAUTIONARY MEASURE, INSTITUTIONAL CONTROLS SUCH AS DEED RESTRICTIONS, DENIAL OF WELL PERMITS, OR ACQUISITION OF WATER RIGHTS WILL BE IMPLEMENTED AS PRACTICABLE AND TO THE EXTENT ALLOWABLE BY LAW TO PREVENT THE USE OF CONTAMINATED GROUND WATER. AGREEMENTS TO IMPLEMENT THESE CONTROLS WILL BE MADE BY EPA, UDOH, AND THE PRPS DURING RD/PA NEGOTIATIONS TO ENSURE THAT THE CONTROLS ARE IMPLEMENTED. THESE CONTROLS WILL REMAIN IN PLACE FOR A PERIOD OF TIME TO BE DETERMINED DURING RD, DEPENDING UPON, AMONG OTHER FACTORS, PRACTICABILITY AND THE EXTENT ALLOWABLE BY LAW. THIS PERIOD OF TIME MAY LATER BE MODIFIED BASED ON THE EFFECTIVENESS OF THE REMEDY.

COST OF THE REMEDY

TABLE 9.1 SHOWS THE DETAILED COST SUMMARY FOR ALTERNATIVE 4, WHILE TABLE 9.2 SHOWS THE SAME FOR ALTERNATIVE GW-2A. THESE TWO ALTERNATIVES TOGETHER COMPRISE THE SELECTED REMEDY WITH A TOTAL ESTIMATED COST OF \$3.9 MILLION. SOME CHANGES MAY BE MADE TO THE REMEDY AS A RESULT OF THE REMEDIAL DESIGN AND CONSTRUCTION PROCESSES. FOR EXAMPLE, THE AMOUNT OF SOILS AND SLUDGES TO BE TREATED WILL DEPEND ON VERIFICATION SAMPLING, AND THE EXTENT OF THE GROUND WATER EXTRACTION SYSTEM WILL DEPEND ON AQUIFER TESTING AND GROUND WATER SAMPLING.

REMEDIAL ACTION OBJECTIVES

THE OBJECTIVES OF THIS REMEDIAL ACTION ARE TO CONTROL PRESENT AND FUTURE RISKS POSED BY DIRECT CONTACT WITH AND INGESTION OF SOILS, SLUDGES, AND GROUND CONTROL THE MIGRATION OF CONTAMINANTS FROM SOILS AND SLUDGES TO GROUND WATER; AND TO PREVENT FUTURE HUMAN EXPOSURE TO RESIDUAL CONTAMINATION IN SOILS AND DIOXIN REMOVAL

WASTES. THE OBJECTIVES WILL BE MET BY ATTAINING REMEDIAL ACTION GOALS.

REMEDIAL GOALS AND PERFORMANCE STANDARDS FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES

FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES, THE REMEDIAL GOAL IS TREATMENT SO THAT THE LEVEL OF CONTAMINANTS REMAINING IN THESE MATERIALS POSES NO UNACCEPTABLE RISK TO HUMAN HEALTH OR THE ENVIRONMENT. SINCE NO FEDERAL OR STATE CHEMICAL-SPECIFIC ARARS EXIST FOR SOILS AND SLUDGES, ACTION LEVELS WERE DETERMINED FOR INDICATOR CHEMICALS THROUGH A SITE-SPECIFIC RISK ANALYSIS. BECAUSE THE LOCATION, CHARACTERISTICS, AND USE OF THE SITE MAKE ITS FUTURE USE FOR RESIDENCES UNLIKELY, ACTION LEVELS TO BE MET BY THE REMEDIAL ACTION FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES WILL RESULT IN (10⁻⁶) CARCINOGENIC RISK FOR AN INDUSTRIAL USE SCENARIO AND A (10⁻⁵) FOR A RESIDENTIAL USE SCENARIO.

SPECIFIC PERFORMANCE STANDARDS, USED TO ENSURE ATTAINMENT OF THE REMEDIAL GOAL FOR THESE MATERIALS, ARE:

1. STAGE, FOR TREATMENT, ALL SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES WITHIN THE SITE CONTAINING INDICATOR CHEMICALS AT LEVELS IN EXCESS OF THE SOILS ACTION LEVELS LISTED IN TABLE 5.2;
2. VITRIFY ALL STAGED SOILS AND SLUDGES SO THAT THE LEVELS OF CONTAMINANTS REMAINING IN THE VITRIFIED SOILS AND SLUDGES DO NOT EXCEED THE SOILS ACTION LEVELS LISTED IN TABLE 5.2, AND VITRIFY ALL STAGED DIOXIN REMOVAL WASTES SO THAT THE LEVELS OF CONTAMINANTS REMAINING IN THE VITRIFIED DIOXIN REMOVAL WASTES DO NOT EXCEED THE LDR TREATMENT STANDARDS LISTED IN TABLE 7.1; AND
3. MEET ALL OTHER ARARS IDENTIFIED IN THIS ROD FOR THE REMEDIATION OF SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES.

THE ISV PROCESS WILL DESTROY OR REMOVE FROM 99.997 TO 99.99995 PERCENT OF ALL ORGANIC CONTAMINANTS OF CONCERN CONSIDERED TOGETHER, AND, IN PARTICULAR, IS EXPECTED TO DESTROY OR REMOVE 99.9999 PERCENT OF DIOXINS. THESE DESTRUCTION AND REMOVAL EFFICIENCIES ARE SUFFICIENT TO LOWER THE CONCENTRATIONS OF SITE CONTAMINANTS TO BELOW ACTION LEVELS FOR SOILS, AND THEREFORE BELOW THE RISK LEVELS DESCRIBED ABOVE.

THE DIOXIN REMOVAL WASTES, WHICH ARE SUBJECT TO THE RELEVANT AND APPROPRIATE LDRS BECAUSE THEY WILL UNDERGO PLACEMENT, WILL BE TREATED TO THE LDR TREATMENT STANDARDS LISTED IN TABLE 7.1.

AN ADDITIONAL AREA OF SOILS CONTAMINATED WITH TOLUENE AND XYLENE, APPROXIMATELY 7,500 FEET SQUARE AND 4 FEET DEEP, WILL BE EXCAVATED, LAND FARMED ON-SITE, AND RETURNED TO THE EXCAVATION AFTER TREATMENT. THE AREA CONTAINING THESE SOILS LIES BETWEEN THE CHLORINE BUILDING AND WAREHOUSE. SINCE THESE PETROLEUM HYDROCARBONS ARE NON-CARCINOGENIC AND THEIR SOILS CONCENTRATIONS ARE BELOW HEALTH-BASED LEVELS, NO ACTION LEVELS HAVE BEEN ESTABLISHED FOR THEM. HOWEVER, ACTION LEVELS WILL BE ESTABLISHED DURING REMEDIAL DESIGN SO THAT THE BOUNDARIES OF MATERIAL TO BE TREATED CAN BE DEFINED. LAND FARMING WILL BE PERFORMED TO MEET THESE ACTION LEVELS. THIS REMEDIAL ACTION WILL BE AN EXTRA MEASURE OF PROTECTION AT THE SITE.

SAMPLING WILL BE PERFORMED DURING REMEDIAL ACTION TO VERIFY THAT MATERIAL CONTAMINATED ABOVE SOILS ACTION LEVELS IS BEING TREATED. ADDITIONAL CONTAMINATED MATERIAL WILL BE MOVED TO THE TREATMENT AREAS PRIOR TO THE START OF VITRIFICATION OR LAND FARMING, AS NECESSARY, UNTIL ATTAINMENT OF SOILS ACTION LEVELS AND PROTECTIVENESS OF HUMAN HEALTH AND THE ENVIRONMENT ARE ENSURED. THIS SAMPLING PROGRAM SHALL BE DEVELOPED DURING REMEDIAL DESIGN.

REMEDIAL GOALS AND PERFORMANCE STANDARDS FOR GROUND WATER

REMEDIAL GOALS FOR GROUND WATER ARE: (1) RESTORING THE CONTAMINATED GROUND WATER TO ITS POTENTIAL FUTURE USES, (2) PROTECTING UNCONTAMINATED GROUND WATER BY MINIMIZING THE MIGRATION OF CONTAMINANTS WITHIN THE GROUND WATER, AND (3) ENSURING THAT THE LEVEL OF CONTAMINANTS REMAINING IN GROUND WATER POSES NO UNACCEPTABLE RISK TO HUMAN HEALTH AND THE ENVIRONMENT. SINCE UDOH AND EPA CONSIDER THE GROUND WATER AT THE SITE TO BE A POTENTIAL FUTURE SOURCE OF DRINKING WATER, SPECIFIC ACTION LEVELS FOR GROUND WATER ARE MCLS AND PROPOSED MCLS AS ESTABLISHED BY THE SAFE DRINKING WATER ACT. ATTAINMENT OF THESE ACTION LEVELS WILL BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND WILL RESTORE THE GROUND WATER TO POTENTIAL BENEFICIAL USES.

SPECIFIC PERFORMANCE STANDARDS, USED TO ENSURE ATTAINMENT OF THE REMEDIATION GOALS FOR GROUND WATER, ARE:

1. REDUCE CONTAMINANT LEVELS IN GROUND WATER (WITHIN THE AREA OF ATTAINMENT) TO MCLS AND PROPOSED MCLS (ACTION LEVELS) FOR ALL CONTAMINANTS FOR WHICH MCLS AND PROPOSED MCLS EXIST, INCLUDING THOSE MCLS AND PROPOSED MCLS LISTED IN TABLE 5.4;
2. WITHIN THE FIRST FIVE YEARS OF GROUND WATER REMEDIAL ACTION, REDUCE, BY AT LEAST 50 PERCENT, THE LEVELS OF CONTAMINANTS FOUND IN GROUND WATER, AS COMPARED TO THE LEVELS FOUND AT THE TIME GROUND WATER REMEDIAL ACTION BEGINS;

3. MEET ALL OTHER ARARS IDENTIFIED IN THIS ROD FOR THE REMEDIATION OF GROUND WATER; AND

4. THE AREA OF ATTAINMENT IS CURRENTLY THE WASATCH CHEMICAL PROPERTY AND THE SOUTHERN PORTION OF THE STEELCO PROPERTY.

THE GROUND WATER PORTION OF THE REMEDY FOR THE SITE, HOWEVER, IS SUBJECT TO POSSIBLE FUTURE MODIFICATION BECAUSE CERTAIN PORTIONS OF GROUND WATER REMAIN UNCHARACTERIZED. THE GROUND WATER PORTION OF THE REMEDY IS FINAL FOR CONTAMINATED GROUND WATER UNDERLYING THE WASATCH CHEMICAL PROPERTY AD THE SOUTHERN PORTION OF THE STEELCO PROPERTY. HOWEVER, CONTAMINATED GROUND WATER UNDERLYING THE NORTHERN PORTION OF THE STEELCO PROPERTY HAS NOT BEEN FULLY CHARACTERIZED. NO REMEDY WILL BE FINALIZED FOR THE CONTAMINATED GROUND WATER UNDERLYING THE NORTHERN PORTION OF THE STEELCO PROPERTY UNTIL IT HAS BEEN ADEQUATELY CHARACTERIZED. FURTHER INVESTIGATIONS AD SUBSEQUENT REMEDIAL DECISIONS REGARDING GROUND WATER BENEATH THE NORTHERN PORTION OF THE STEELCO PROPERTY MAY NECESSITATE FUTURE MODIFICATION OF THE GROUND WATER REMEDY FOR THE WASATCH CHEMICAL PROPERTY AD THE SOUTHERN PORTION OF THE STEELCO PROPERTY, OR OTHER REMEDIAL ACTION.

GROUND WATER WILL BE EXTRACTED UNTIL ACTION LEVELS ARE ACHIEVED. IT SHOULD BE RECOGNIZED, HOWEVER, THAT EPA STUDIES HAVE INDICATED THAT IT MAY NOT ALWAYS BE POSSIBLE TO REACH MCLS OR PROPOSED MCLS THROUGH CURRENTLY AVAILABLE TECHNOLOGY. IF IT BECOMES APPARENT DURING IMPLEMENTATION OR OPERATION OF THE GROUND WATER EXTRACTION SYSTEM THAT CONTAMINANT LEVELS HAVE CEASED TO DECLINE AND ARE REMAINING CONSTANT AT LEVELS HIGHER THAN THOSE SET OUT IN THE PERFORMANCE STANDARDS, THE SYSTEM'S PERFORMANCE STANDARDS AND THE REMEDY MAY BE REEVALUATED BY EPA AND UDOH.

PERFORMANCE OF THE GROUND WATER REMEDY WILL BE CAREFULLY MONITORED ON A REGULAR BASIS AND ADJUSTED AS WARRANTED BY THE PERFORMANCE DATA COLLECTED DURING OPERATION. THE OPERATING SYSTEM MAY INCLUDE DISCONTINUING OPERATION OF EXTRACTION WELLS IN AREAS WHERE PERFORMANCE STANDARDS HAVE BEEN ATTAINED, ALTERNATE PUMPING OF THE WELLS TO ELIMINATE STAGNATION POINTS, PULSE PUMPING TO ALLOW AQUIFER EQUILIBRATION AND ENCOURAGE ADSORBED CONTAMINANTS TO PARTITION INTO GROUND WATER FOR EXTRACTION AND TREATMENT, AND INSTALLATION OF ADDITIONAL EXTRACTION WELLS TO FACILITATE OR ACCELERATE CLEANUP OF THE CONTAMINANT PLUME.

COMPLIANCE SAMPLING PROGRAM

A SAMPLING PROGRAM FOR MONITORING THE REMEDIAL ACTION AND DETERMINING COMPLIANCE WITH THE PERFORMANCE STANDARDS SHALL BE IMPLEMENTED DURING THE REMEDIAL ACTION. IN ADDITION, TO ENSURE THAT GROUND WATER PERFORMANCE STANDARDS ARE MAINTAINED, IT IS EXPECTED THAT GROUND WATER WILL BE MONITORED AT LEAST TWICE ANNUALLY DURING THE GROUND WATER SEASONAL HIGH AND LOW FOR A PERIOD OF AT LEAST 3 YEARS FOLLOWING DISCONTINUATION OF GROUND WATER EXTRACTION. THESE MONITORING PROGRAMS WILL BE DEVELOPED DURING RD AND SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING: ANALYTICAL PARAMETERS (FOCUSING ON INDICATOR CHEMICALS, BUT ANALYZING OTHER CONTAMINANTS, IF ANY, THAT ARE NOT INDICATOR CHEMICALS AND ARE DETERMINED TO BE OCCURRING AT LEVELS EXCEEDING MCLS OR PROPOSED MCLS), SAMPLING POINTS, SAMPLING FREQUENCY AND DURATION, AND STATISTICAL METHODS FOR EVALUATING DATA. SPECIFIC PERFORMANCE MONITORING POINTS SHALL BE SPECIFIED DURING REMEDIAL DESIGN.

BECAUSE THE SOILS ACTION LEVELS ESTABLISHED IN THIS ROD ARE HEALTH-BASED STANDARDS FOR INDUSTRIAL USE OF THE SITE, AND NOT UNLIMITED USE WITH UNRESTRICTED EXPOSURE, AND BECAUSE THE GROUND WATER REMEDY MAY LEAVE RESIDUAL HAZARDOUS SUBSTANCES ABOVE ACTION LEVELS (MCLS OR PROPOSED MCLS), RULING OUT UNLIMITED USE OF ON-SITE GROUND WATER, THE SELECTED REMEDY WILL REQUIRE A FIVE-YEAR REVIEW UNDER SECTION 121(C) OF CERCLA, SECTION 300.430(F)(4)(II) OF THE NCP, AND APPLICABLE GUIDANCE, TO ASSURE THE LONG-TERM EFFECTIVENESS OF THE REMEDY. HOWEVER, ONCE THE EFFECTIVENESS OF THE ISV PORTION OF THE REMEDY IN ATTAINING HEALTH-BASED ACTION LEVELS FOR UNLIMITED USE IS CONFIRMED, THERE WILL BE NO NEED FOR CONTINUED MONITORING OF THE NON-HAZARDOUS VITRIFIED MATERIAL.

STATUTORY DETERMINATIONS FOR THE SELECTED REMEDY

THE SELECTED REMEDY MEETS THE STATUTORY REQUIREMENTS OF SECTION 121 OF CERCLA. THE STATUTE REQUIRES THAT REMEDIAL ACTION UNDERTAKEN AT SUPERFUND SITES BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. THE STATUTE ALSO MANDATES THAT THE SELECTED REMEDY COMPLY WITH APPLICABLE OR RELEVANT AND APPROPRIATE ENVIRONMENTAL STANDARDS ESTABLISHED UNDER FEDERAL AND STATE ENVIRONMENTAL LAWS UNLESS A STATUTORY WAIVER IS JUSTIFIED. IN ADDITION, THE SELECTED REMEDY MUST BE COST-EFFECTIVE AND UTILIZE PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. THE STATUTE ALSO INCLUDES A PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT THAT PERMANENTLY AND SIGNIFICANTLY REDUCES THE VOLUME, TOXICITY, OR MOBILITY OF HAZARDOUS SUBSTANCES AS THEIR PRINCIPAL ELEMENT. THE FOLLOWING SECTIONS DESCRIBE HOW THE SELECTED REMEDY MEETS THESE STATUTORY REQUIREMENTS.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

THE REMEDY SELECTED FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES AT THE WASATCH CHEMICAL SITE PROTECTS HUMAN HEALTH AD THE ENVIRONMENT BY TREATING THESE MATERIALS WITH ISV TO DESTROY AND IMMOBILIZE CONTAMINANTS.

CONTAMINANTS LEVELS IN THESE MATERIALS WILL BE REDUCED TO, OR BELOW, HEALTH-BASED ACTION LEVELS FOLLOWING TREATMENT. REDUCTION OF CONTAMINANTS TO THESE CLEAN UP LEVELS WILL REDUCE THE CARCINOGENIC RISK TO (10-6) GIVEN CONTINUED INDUSTRIAL USE OF THE SITE. THIS LEVEL OF RISK FALLS WITHIN EPA'S ACCEPTABLE RISK RANGE OF (10-4) TO (10-4). FOLLOWING THE REMEDIAL ACTION FOR SOILS, SLUDGES, AD DIOXIN REMOVAL WASTES, THE HAZARD INDEX FOR NON-CARCINOGENS WILL BE LESS THAN ONE.

AS EXTRA PRECAUTIONARY MEASURES, DEED RESTRICTIONS ON FUTURE USE OF THE SITE, ACCESS CONTROL MEASURES, AND CAPPING WILL ALL ACT TO MINIMIZE HUMAN EXPOSURE TO AY RESIDUAL CONTAMINANTS.

THE REMEDY SELECTED FOR GROUND WATER AT THE WASATCH CHEMICAL SITE PROTECTS HUMAN HEALTH AND THE ENVIRONMENT BY REDUCING THE LEVELS OF CONTAMINANTS FOUND IN THE SHALLOW PORTIONS OF THE AQUIFER UNDERLYING THE SITE TO MCLS AND PROPOSED MCLS. IN ADDITION, THE EXTRACTED GROUND WATER WILL BE TREATED WITH AIR STRIPPING TO THE EXTENT NECESSARY TO MEET THE APPROPRIATE STANDARDS PRIOR TO DISCHARGE, AS FURTHER EXPLAINED BELOW IN THE ARARS DISCUSSION. RESTORATION OF GROUND WATER TO MCLS AND PROPOSED MCLS WILL ENSURE THAT GROUND WATER AT THE SITE WILL COMPLY WITH THE SAFE DRINKING WATER ACT, THEREBY PROVIDING PROTECTIVENESS IN THE CASE OF INGESTION OF OR CONTACT WITH THE WATER. ALTHOUGH THE SHALLOW GROUND WATER AT THE SITE IS NOT CURRENTLY BEING USED AS A DRINKING WATER SOURCE, ATTAINMENT OF MCLS OR PROPOSED MCLS FOR CONTAMINANTS OF CONCERN WILL ASSURE THAT SITE RISKS FROM THIS POTENTIAL PATHWAY FALL WITHIN THE EPA ACCEPTABLE RISK RANGE. AS EXTRA PRECAUTIONARY MEASURES, INSTITUTIONAL CONTROLS WILL BE APPLIED AS PRACTICABLE AND TO THE EXTENT ALLOWED BY LAW. DEED RESTRICTIONS ON GROUND WATER USE, DENIAL OF WELL PERMITS, AND ACQUISITION OF GROUND WATER RIGHTS WOULD REDUCE THE POSSIBILITY OF HUMAN EXPOSURE TO CONTAMINATED GROUND WATER.

OF THE ALTERNATIVES EVALUATED FOR CLEANING UP SOILS, SLUDGES, DIOXIN REMOVAL WASTES, AD GROUND WATER, THE SELECTED REMEDY PROVIDES THE BEST PROTECTION OF HUMAN HEALTH WITHOUT SIGNIFICANT ADVERSE IMPACT TO THE ENVIRONMENT. NO UNACCEPTABLE SHORT-TERM RISKS OR CROSS-MEDIA IMPACTS WILL BE CAUSED BY IMPLEMENTING THIS REMEDY.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

UNDER SECTION 121(D)(1) OF CERCLA, REMEDIAL ACTIONS MUST ATTAIN STANDARDS, REQUIREMENTS, LIMITATIONS, OR CRITERIA THAT ARE "APPLICABLE OR RELEVANT AND APPROPRIATE" UNDER THE CIRCUMSTANCES OF THE RELEASE AT A SITE. ALL ARARS WOULD BE MET UPON COMPLETION OF THE SELECTED REMEDY AT THE WASATCH CHEMICAL SITE.

FEDERAL ARARS CONTROL UNLESS STATE STANDARDS ARE MORE STRINGENT THAN FEDERAL REQUIREMENTS. IF, HOWEVER, THE FEDERAL PROGRAM UNDER RCRA, THE CLEAN WATER ACT, THE CLEAR AIR ACT, AND THE SAFE DRINKING WATER ACT, HAS BEEN DELEGATED TO, AND ADMINISTERED BY UDOH, THEN STATE ARARS CONTROL.

THOSE FEDERAL REQUIREMENTS WHICH HAVE NOT YET BEEN ADOPTED BY THE STATE UNDER A DELEGATED PROGRAM CONTROL FOR PURPOSES OF DETERMINING ARARS FOR THE SITE. FEDERAL AND STATE ARARS AND TO-BE-CONSIDERED (TBC) ITEMS FOR THE SELECTED REMEDY ARE LISTED IN TABLE 10.1.

CHEMICAL-SPECIFIC ARAS

THE SELECTED REMEDY WILL COMPLY WITH CHEMICAL-SPECIFIC ARARS RELATED TO GROUND WATER AND AMBIENT AIR QUALITY AT THE SITE.

THE PRINCIPAL CHEMICAL-SPECIFIC ARARS FOR THE REMEDY ARE PRIMARY DRINKING WATER STANDARDS ESTABLISHED BY THE SAFE DRINKING WATER ACT (AND ADOPTED UNDER UTAH LAW), WHICH ARE RELEVANT AND APPROPRIATE. MCLS HAVE BEEN DESIGNATED FOR SOME CONTAMINANTS AT THE SITE. MCLS HAVE BEEN PROPOSED FOR OTHER CONTAMINANTS. PROPOSED MCLS ARE "TO BE CONSIDERED" (TBC) AND WILL ALSO BE COMPLIED WITH. CONCENTRATIONS OF CONTAMINANTS IN GROUND WATER WILL BE REDUCED TO MCLS AND PROPOSED MCLS THROUGH IMPLEMENTATION OF THE GROUND WATER EXTRACTION AND TREATMENT SYSTEM.

UTAH GROUND WATER PROTECTION REGULATION REQUIREMENTS WILL BE MET THROUGH SOURCE CONTROL.

GROUND WATER TREATMENT AND LANDFARMING ARE LIKELY TO PRODUCE AIR EMISSIONS. CONTROLS WILL BE IMPLEMENTED AS REQUIRED TO ENSURE COMPLIANCE WITH NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS), NEW SOURCE PERFORMANCE STANDARDS (NSPS), AND NATIONAL EMISSIONS STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS), ALL OF WHICH ARE RELEVANT AND APPROPRIATE.

ACTION-SPECIFIC ARARS

THE SELECTED REMEDY WILL COMPLY WITH ACTION-SPECIFIC ARARS, PRIMARILY RCRA, THE UTAH POLLUTANT DISCHARGE ELIMINATION SYSTEM (UPDES), UTAH AIR QUALITY REQUIREMENTS, AND PRETREATMENT STANDARDS FOR POTWS.

RCRA HAS BEEN DETERMINED NOT TO BE APPLICABLE TO THE REMEDIAL ACTION. HOWEVER, RCRA REQUIREMENTS HAVE BEEN EVALUATED TO DETERMINE WHETHER THEY ARE RELEVANT AND APPROPRIATE BASED UPON THE CIRCUMSTANCES OF THE RELEASES, NATURE OF THE HAZARDOUS MATERIALS, SITE CHARACTERISTICS, AND NATURE OF THE REQUIREMENTS.

LDRS ARE RELEVANT AND APPROPRIATE REQUIREMENTS UNDER RCRA BECAUSE, AS PART OF THE SELECTED REMEDY, HAZARDOUS MATERIALS SIMILAR TO RCRA LISTED WASTES WILL BE CONSOLIDATED IN A MANNER THAT FALLS WITHIN THE RCRA DEFINITION OF "PLACEMENT." AS DESCRIBED EARLIER, THESE DIOXIN REMOVAL WASTES ARE FOUND IN A DISCRETE AREA AND THEREFORE ARE NOT CONSIDERED PART OF THE AOC THAT INCLUDES ALL CONTAMINATION AT THE SITE. SINCE CONSOLIDATION OF THE DIOXIN REMOVAL WASTES IN THE FORMER EVAPORATION POND PRIOR TO TREATMENT WILL NOT MEET THE LDR TREATMENT STANDARDS PRIOR TO PLACEMENT, THE TREATMENT REQUIREMENT IS BEING TEMPORARILY WAIVED USING AN IMW, GRANTED THROUGH THE SIGNING OF THIS ROD. THE IMW IS BEING USED BECAUSE PLACEMENT OF THESE MATERIALS WILL BE FOLLOWED BY TREATMENT WITH ISV. THIS REMEDIATION PROCESS WILL ATTAIN SOILS AND DEBRIS VARIANCE TREATABILITY STANDARDS AND THE MORE STRINGENT LDR TREATMENT STANDARDS (A TREATABILITY STUDY CONDUCTED WITH CONTAMINATED SOILS DEMONSTRATED THE ABILITY OF ISV TECHNOLOGY TO ATTAIN BOTH STANDARDS; THE SAME RESULTS ARE EXPECTED FOR THE DIOXIN REMOVAL WASTES AND WILL BE VERIFIED THROUGH AN ADDITIONAL TREATABILITY STUDY USING THESE MATERIALS). THE IMW WILL NOT CAUSE ADDITIONAL MIGRATION OF CONTAMINANTS, COMPLICATE THE SITE RESPONSE, PRESENT AN IMMEDIATE THREAT TO PUBLIC HEALTH OR THE ENVIRONMENT, OR INTERFERE WITH OR DELAY THE FINAL REMEDY.

THE MATERIAL RESULTING FROM THE ISV TREATMENT IS NOT EXPECTED TO BE HAZARDOUS OR REQUIRE MAINTENANCE.

RELEVANT AND APPROPRIATE RCRA REQUIREMENTS ALSO PRESCRIBE THAT MATERIAL CONSOLIDATED IN THE FORMER EVAPORATION POND FOR TREATMENT WILL NOT MIGRATE OUT OF THAT POND. SPECIFIC MEASURES WILL BE TAKEN, SUCH AS INSTALLATION OF AN IMPERMEABLE LINER IN THE POND PRIOR TO CONSOLIDATION, TO PREVENT THE MIGRATION OF CONTAMINANTS PLACED THERE. THIS ALTERNATIVE WILL FULLY COMPLY WITH FEDERAL AND STATE AIR QUALITY REGULATIONS SUCH AS THE CLEAN AIR ACT PRIMARY AND SECONDARY AIR QUALITY STANDARDS AND THE UTAH AIR CONSERVATION REGULATIONS THROUGH TREATMENT OF ISV OFF-GAS. OFF-SITE DISPOSAL OF ANY FILTERS USED IN THIS ALTERNATIVE WILL COMPLY WITH THE OFF-SITE POLICY. DISCHARGE OF WATER RESULTING FROM ANY DE-WATERING OF THE FORMER EVAPORATION POND WILL MEET UPDES OR POTW REQUIREMENTS.

IN ADDITION, THE RCRA STORAGE FACILITY CLOSURE WILL OCCUR DURING THE CERCLA ACTION. ALL RCRA CLOSURE REQUIREMENTS WILL BE MET AND IT IS INTENDED THAT FORMAL RCRA CLOSURE WILL BE ACCOMPLISHED SIMULTANEOUSLY THROUGH COORDINATION WITH RCRA AUTHORITIES.

THE GROUND WATER PORTION OF THE REMEDY WILL COMPLY WITH MCLS AND PROPOSED MCLS BY EXTRACTING GROUND WATER CONTAMINATED ABOVE THESE LEVELS. DISCHARGE OF TREATED WATER TO THE 700 WEST DITCH OR TO THE POTW THROUGH THE SEWER SYSTEM WILL COMPLY WITH UPDES OR POTW STANDARDS. AIR RELEASES FROM GROUND WATER TREATMENT WILL COMPLY WITH ARARS THROUGH THE USE OF FILTERS AND TREATMENT OF THE AIR EFFLUENT STREAM, TO THE EXTENT NECESSARY.

LOCATION-SPECIFIC ARARS

NO LOCATION-SPECIFIC ARARS HAVE BEEN IDENTIFIED.

TO BE CONSIDERED (TBCS)

WHILE NOT ARARS, TBCS SHOULD BE CONSIDERED WITH REGARD TO REMEDIATION. PROPOSED MCLS, WHICH IN CONTRAST TO FINAL MCLS HAVE NOT BEEN PROMULGATED, ARE TBCS. PROPOSED MCLS WILL BE COMPLIED WITH, AS THEY ARE INCLUDED IN THE GROUND WATER ACTION LEVELS.

COST-EFFECTIVENESS

THE SELECTED REMEDY IS COST EFFECTIVE IN MITIGATING THE RISKS POSED AT THE SITE BY CONTAMINATED SOILS, SLUDGES, DIOXIN REMOVAL WASTES, AND GROUND WATER. SECTION 300.430(F)(II)(D) OF THE NCP STATES THAT ONCE A REMEDIAL ACTION SATISFIES THE THRESHOLD CRITERIA SET FORTH IN SECTION 300.430(F)(1)(II)(A) AND (B) (I.E., OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT AND COMPLIANCE WITH ARARS), COST-EFFECTIVENESS IS DETERMINED BY EVALUATING THREE OF THE FIVE BALANCING CRITERIA NOTED IN SECTION 300.430(F)(1)(I)(B) TO DETERMINE OVERALL EFFECTIVENESS: LONG-TERM EFFECTIVENESS AND PERMANENCE, REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT, AND SHORT-TERM EFFECTIVENESS. OVERALL EFFECTIVENESS IS THEN COMPARED TO COST TO ENSURE THAT THE REMEDY IS COST-EFFECTIVE.

THE SELECTED REMEDY FOR SOILS, SLUDGES, DIOXIN REMOVAL WASTES, AND HYDROCARBON CONTAMINATED SOILS PROVIDES THE BEST OVERALL EFFECTIVENESS OF ALL ALTERNATIVES CONSIDERED PROPORTIONAL TO ITS COST. THE SELECTED REMEDY WILL GREATLY REDUCE THE TOXICITY, MOBILITY, AND VOLUME OF SOILS EXCEEDING TARGET CLEANUP GOALS, SLUDGES CONTAINING HAZARDOUS MATERIAL, AND THE DIOXIN REMOVAL WASTES. ALSO, THE IMPLEMENTATION OF THIS REMEDY WILL RESULT IN LONG-TERM EFFECTIVENESS BY REDUCING RESIDUAL CARCINOGENIC RISKS TO (10⁻⁶), BASED ON CONTINUED INDUSTRIAL USE OF THE SITE, THROUGH PERMANENT TREATMENT. ALTERNATIVES 5 AND 8 ALSO PROVIDE HIGH OVERALL EFFECTIVENESS. HOWEVER, ALTERNATIVE 5 IS MORE EXPENSIVE THAN THE SELECTED REMEDY AND REQUIRES MORE MATERIAL

HANDLING. ALTHOUGH ALTERNATIVE 8 IS LESS EXPENSIVE, IT DOES NOT MEET THE STATUTORY PREFERENCE FOR PERMANENT TREATMENT, AND INVOLVES MORE MATERIAL HANDLING AND PROCESSING THAN OTHER ALTERNATIVES THEREBY DECREASING SHORT-TERM EFFECTIVENESS.

THE SELECTED REMEDY FOR GROUND WATER PROVIDES THE BEST OVERALL EFFECTIVENESS AT THE LOWEST COST. ALL ALTERNATIVES WILL GREATLY REDUCE THE TOXICITY, MOBILITY, AND VOLUME OF AFFECTED GROUND WATER AND WILL BE PERMANENT SOLUTIONS. ALTERNATIVE GW-2A WOULD REMOVE A LARGER VOLUME OF AFFECTED GROUND WATER MORE RAPIDLY THAN ALTERNATIVES GW-3A AND GW-3B, THEREBY REDUCING TOXICITY AND MOBILITY MORE RAPIDLY. SIMILARLY, ALTERNATIVE GW-2A REQUIRES LESS MATERIAL HANDLING AND THEREFORE HAS HIGHER SHORT-TERM EFFECTIVENESS. FINALLY, THE SELECTED REMEDY IS THE LEAST EXPENSIVE OF ALL THE ALTERNATIVES CONSIDERED, EXCEPT FOR THE NO ACTION ALTERNATIVE.

UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES (OR RESOURCE RECOVERY TECHNOLOGIES) TO THE MAXIMUM EVENT PRACTICABLE

UDOH AND EPA HAVE DETERMINED THAT THE SELECTED REMEDY FOR THE WASATCH CHEMICAL SITE REPRESENTS THE MAXIMUM EXTENT TO WHICH PERMANENT SOLUTIONS AND TREATMENT TECHNOLOGIES CAN BE UTILIZED IN A COST-EFFECTIVE MANNER TO REMEDIATE SOILS, SLUDGES, DIOXIN REMOVAL WASTE, AND GROUND WATER AT THE SITE. OF THOSE ALTERNATIVES THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND COMPLY WITH ARARS, THE SELECTED REMEDY (ALTERNATIVE 4 FOR SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES, AND ALTERNATIVE GW-2A FOR GROUND WATER) WILL PROVIDE THE BEST BALANCE OF TRADE-OFFS IN TERMS OF LONG-TERM EFFECTIVENESS AND PERMANENCE; REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT; SHORT-TERM EFFECTIVENESS; IMPLEMENTABILITY; COST; THE STATUTORY PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT; AND UDOH AND COMMUNITY ACCEPTANCE. THE FOLLOWING DISCUSSION OF TRADEOFFS AMONG ALTERNATIVES ARE DIVIDED INTO SECTIONS FOR SOILS, SLUDGES, DIOXIN REMOVAL WASTES, AND GROUND WATER.

SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES

FOR THE ALTERNATIVES FOR REMEDIATING SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES, THE MORE CRITICAL EVALUATION CRITERIA WERE REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT, LONG-TERM EFFECTIVENESS, AND IMPLEMENTABILITY.

THE WIDE VARIETY AND HIGH CONCENTRATIONS OF CONTAMINANTS FOUND AT THE SITE MAKE ALTERNATIVES INVOLVING TREATMENT PREFERABLE OVER THOSE THAT DO NOT. ADDITIONALLY, LDRS MAKE DISPOSAL OPTIONS DIFFICULT. WHILE ALTERNATIVES 4 AND 5 TREAT CONTAMINATED MATERIALS, ALTERNATIVE 4 HAS BEEN DEMONSTRATED TO MEET TREATMENT STANDARDS FOR ALL SITE CONTAMINANTS, WHILE ALTERNATIVE 5 HAS NOT.

ALTERNATIVES 4 AND 5 ALSO BEST MEET THE LONG-TERM EFFECTIVENESS CRITERIA BECAUSE THEY DESTROY CONTAMINANTS. IMPLEMENTABILITY, THE THIRD CRITICAL EVALUATION CRITERION, IS A TRADEOFF WITH REGARD TO ALTERNATIVES 4 AND 5 BECAUSE THEY ARE BOTH INNOVATIVE TECHNOLOGIES. TREATABILITY STUDIES WERE THEREFORE CONDUCTED FOR THESE TECHNOLOGIES, WITH ENCOURAGING RESULTS. ALTERNATIVES 7 AND 8 ON THE OTHER HAND, ARE EASILY IMPLEMENTABLE BUT FALL SHORT WILL REGARD TO TREATMENT AND LONG-TERM EFFECTIVENESS.

GROUND WATER

FOR THE ALTERNATIVES FOR REMEDIATING GROUND WATER, THE MORE CRITICAL EVALUATION CRITERIA WERE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT AND IMPLEMENTABILITY.

SINCE GROUND WATER AT THE SITE IS A RESOURCE THAT NEEDS TO BE PROTECTED FOR POTENTIAL FUTURE USE, ITS RESTORATION, RATHER THAN SIMPLY CONTAINMENT OF CONTAMINANTS, IS PREFERABLE. ALTERNATIVE GW-2A IS BETTER SUITED FOR REMEDIATION THAN ALTERNATIVES - GW-3A AND GW-3B WHICH RELY MORE HEAVILY ON CONTAINMENT WITH A SLURRY WALL. IMPLEMENTABILITY IS BETTER WITH REGARD TO ALTERNATIVE GW-2A BECAUSE THE OTHER ALTERNATIVES RELY ON INNOVATIVE TECHNOLOGIES FOR WHICH NO TREATABILITY STUDIES WERE CONDUCTED DURING THE RI/FS, OR RELY ON A SLURRY WALL THAT MAY BE DIFFICULT TO MAINTAIN OVER A LONG PERIOD OF TIME.

UDOH AND EPA ARE IN AGREEMENT WITH REGARD TO THE REMEDIAL ALTERNATIVE SELECTED FOR SOILS, SLUDGES, DIOXIN REMOVAL WASTES, AND GROUND WATER FOR THE WASATCH CHEMICAL SITE. THE COMMUNITY WAS INVITED TO COMMENT ON THE SELECTED ALTERNATIVES, AS WELL AS ALL OTHER ALTERNATIVES. NO OPPOSITION TO ALTERNATIVES 4 AND GW-2A (WHICH COMPRISE THE SELECTED REMEDY) WAS VOICED.

PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

THE SELECTED ALTERNATIVES FOR REMEDIATION OF CONTAMINATED SOILS, SLUDGES, DIOXIN REMOVAL WASTES AND GROUND WATER SATISFY THE STATUTORY PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT AS A PRINCIPAL ELEMENT. BY TREATING CONTAMINATED SOILS, SLUDGES, AND DIOXIN REMOVAL WASTES THROUGH ISV, THE SELECTED REMEDY ADDRESSES ONE OF THE PRINCIPAL THREATS POSED BY THE SITE - CONTAMINANTS FOUND IN THESE MATERIALS -- THROUGH THE USE OF TREATMENT TECHNOLOGIES. ADDITIONALLY, GROUND WATER WILL BE EXTRACTED UNTIL WATER REMAINING IN THE AQUIFER MEETS MCLS AND PROPOSED MCLS FOR CONTAMINANTS FOUND IN GROUND WATER. EXTRACTED GROUND WATER WILL BE TREATED TO THE EXTENT NECESSARY WITH AIR STRIPPING TO REDUCE CONTAMINANTS IN THE EXTRACTED WATER TO LEVELS ACCEPTABLE FOR DISCHARGE TO A POTW OR THE 700 WEST DITCH.

THEREFORE, THE STATUTORY PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT AS A PRINCIPAL ELEMENT IS SATISFIED.

TABLE 5.2

CONCENTRATIONS OF INDICATOR CHEMICALS FOUND IN SOURCE
AREAS (SLUDGES) AND SOILS DURING THE REMEDIAL INVESTIGATION
AND ACTION LEVELS AT THE WASATCH CHEMICAL SITE

INDICATOR CHEMICALS	HIGHEST CONC. IN SLUDGE (PPB)
HERBICIDES	
2,4-D	634
2,4,5-T	300
PESTICIDES	
4,4'DDD	280
4,4'-DDE	6,300
4,4'-DDT	2,800
ALPHA-CHLORDANE	520,000
GAMMA-CHLORDANE	680,000
HEPTACHLOR	26,000
DIOXINS	
TCDD (TOTAL	13
SEMI-VOLATILE ORGANIC COMPOUNDS	
HEXACHLOROBENZENE	49,000
PENTACHLOROPHENOL	460,000
VOLATILE ORGANIC COMPOUNDS	
TRICHLOROETHENE	440,000
TETRACHLOROETHENE	200,000

TABLE 5.2 (CONTINUED)

INDICATOR CHEMICALS	HIGHEST CONC. IN SOIL (PPB)	ACTION LEVELS (PPB)
HERBICIDES		
2,4-D	30,768	
2,4,5-T	1,111	
PESTICIDES		
4,4'-DDD	400	26,000
4,4'-DDE	4,500	19,000
4,4'-DDT	8,100	19,000
ALPHA-CHLORDANE	520,000	520,000
GAMMA-CHLORDANE	890,000	7,000
HEPTACHLOR	5,300	2,000
DIOXINS		
TCDD (TOTAL)	11	20
SEMI-VOLATILE ORGANIC COMPOUNDS		
HEXACHLOROBENZENE	66,000	7,000
VOLATILE ORGANIC COMPOUNDS		
TRICHLOROETHENE	1,800	103,000
TETRACHLOROETHENE	22,000	22,000

NOTE: HEPTACHLOR, 4,4'-DDT, 4,4'-DDE, AND 4,4'-DDD, DIOXIN AND HEXACHLOROBENZENE ARE CLASSIFIED AS PROBABLE HUMAN CARCINOGENS. CHLORDANE, 2,4-D, 2,4,5-T, PENTACHLOROPHENOL, TRICHLOROETHENE AND TETRACHLOROETHENE ARE SUSPECTED HUMAN CARCINOGENS.

THREE OF THE INDICATOR CHEMICALS (PCP, 2-4D, AND 2,4,5-T) WERE NOT CONSIDERED IN DEVELOPING TARGET CLEAN-UP GOALS BECAUSE CONCENTRATION LEVELS OF THESE CHEMICALS DETECTED AT THE SITE ARE NOT ABOVE ANY HEALTH BASED CRITERIA THAT WOULD BE DEVELOPED FOR THIS SITE. IN ADDITION, THE HIGHEST CONCENTRATIONS OF THESE CHEMICALS ARE FOUND IN AREAS WHERE OTHER INDICATOR CHEMICALS ARE ALSO PRESENT. IT IS THEREFORE EXPECTED THAT ANY REMEDIAL ACTIVITY WHICH ADDRESSES THE INDICATOR CHEMICALS CURRENTLY HAVING ACTION LEVELS WILL ALSO REDUCE CONCENTRATIONS OF THESE CHEMICALS TO ACCEPTABLE LEVELS.

TABLE 5.3

ESTIMATED SOIL AND WASTE SLUDGE VOLUME TO BE REMEDIATED

SYSTEM	ESTIMATED VOLUME (CUBIC YARDS)
CONTAMINATED SOIL	1189
PROCESS DRAIN SYSTEM	19
YARD DRAIN SYSTEM	30
LOT 6 SEPTIC SYSTEM	21
FORMER EVAPORATION POND	2300
WASTE PILES IN FERTILIZER BUILDING	15
DRUMMED SOIL (INVESTIGATION-DERIVED WASTE)	13
PETROLEUM HYDROCARBON CONTAMINATED SOIL (FOR LANDFARMING)	1,111
UDOH OVERSIGHT DERIVED MATERIALS	LT 1
TOTAL	4,698

TABLE 5.4

CONCENTRATION OF INDICATOR CHEMICALS FOUND IN GROUND WATER
AND ACTION LEVELS AT THE WASATCH CHEMICAL SITE
(UNITS IN MICROGRAMS/LITER, (UG/L))

COMPOUND	MAXIMUM VALUE (MONITOR WELL)
VOLATILE ORGANIC COMPOUNDS	
TETRACHLOROETHENE (PCE)	1,400 (MW-12)
TRICHLOROETHENE (TCE)	8,000 (MW-07)
1,1-DICHLOROETHENE (1,1-DCE)	230 (MW-12)
SEMIVOLATILE ORGANIC COMPOUNDS	
PENTACHLOROPHENOL (PCP)	630 (MW-10)
HERBICIDES AND PESTICIDES	
2,4-DICHLOROPHENOXYACETIC ACID (2,4-D)	26 (MW-12)

TABLE 5.4 (CONTINUED)

COMPOUND	GEOMETRIC MEAN (NOT INCLUDING 3RD ROUND SAMPLES)	ACTION LEVEL (MCL) (2)
VOLATILE ORGANIC COMPOUNDS		
TETRACHLOROETHENE (PCE)	21	5
TRICHLOROETHENE (TCE)	78	5
1,1-DICHLOROETHENE(4) (1,1-DCE)	53	7
COMPOUND	GEOMETRIC MEAN (NOT INCLUDING 3RD ROUND SAMPLES)	ACTION LEVEL (MCL) (2)

SEMIVOLATILE ORGANIC COMPOUNDS

PENTACHLOROPHENOL (PCP)	508	1
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HERBICIDES AND PESTICIDES

2,4-DICHLOROPHENOXYACETIC ACID (2,4-D)	7.6	70
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FOR PHASE 1, PHASE 11, AND THIRD ROUND SAMPLING

MCL - MAXIMUM CONTAMINANT LEVEL (DRINKING WATER REGULATIONS UNDER THE
SAFE DRINKING WATER ACT)

THESE INDICATOR CHEMICALS, A SUBSET OF INDICATOR CHEMICALS IDENTIFIED
FOR SOIL AND WASTE, WERE SELECTED BASED ON THE FREQUENCY OF DETECTION,
MAGNITUDE OF DETECTED CONCENTRATIONS, AND PHYSICOCHEMICAL PROPERTIES
(FOR EXAMPLE, TOXICITY, CHEMICAL FATE, AND PERSISTENCE).

ALTHOUGH NOT LISTED AS AN INDICATOR CHEMICAL FOR GROUND WATER IN THE FS,
1,1-DCE IS A PRIMARY CONTAMINANT OF CONCERN AT THE SITE WITH A FREQUENCY
OF OCCURRENCE OF 27.3 PERCENT AND A MEDIAN CONCENTRATION OF 100 UG/L.
IT IS ANTICIPATED THAT THE SELECTED GROUND WATER REMEDY FOR INDICATOR
CHEMICALS WILL ALSO TREAT 1,1-DCE TO BELOW THE MCL.